February 16, 1948

STEEL

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ESTABLISHED 1882

EDITORIAL INDEX, PAGE 45

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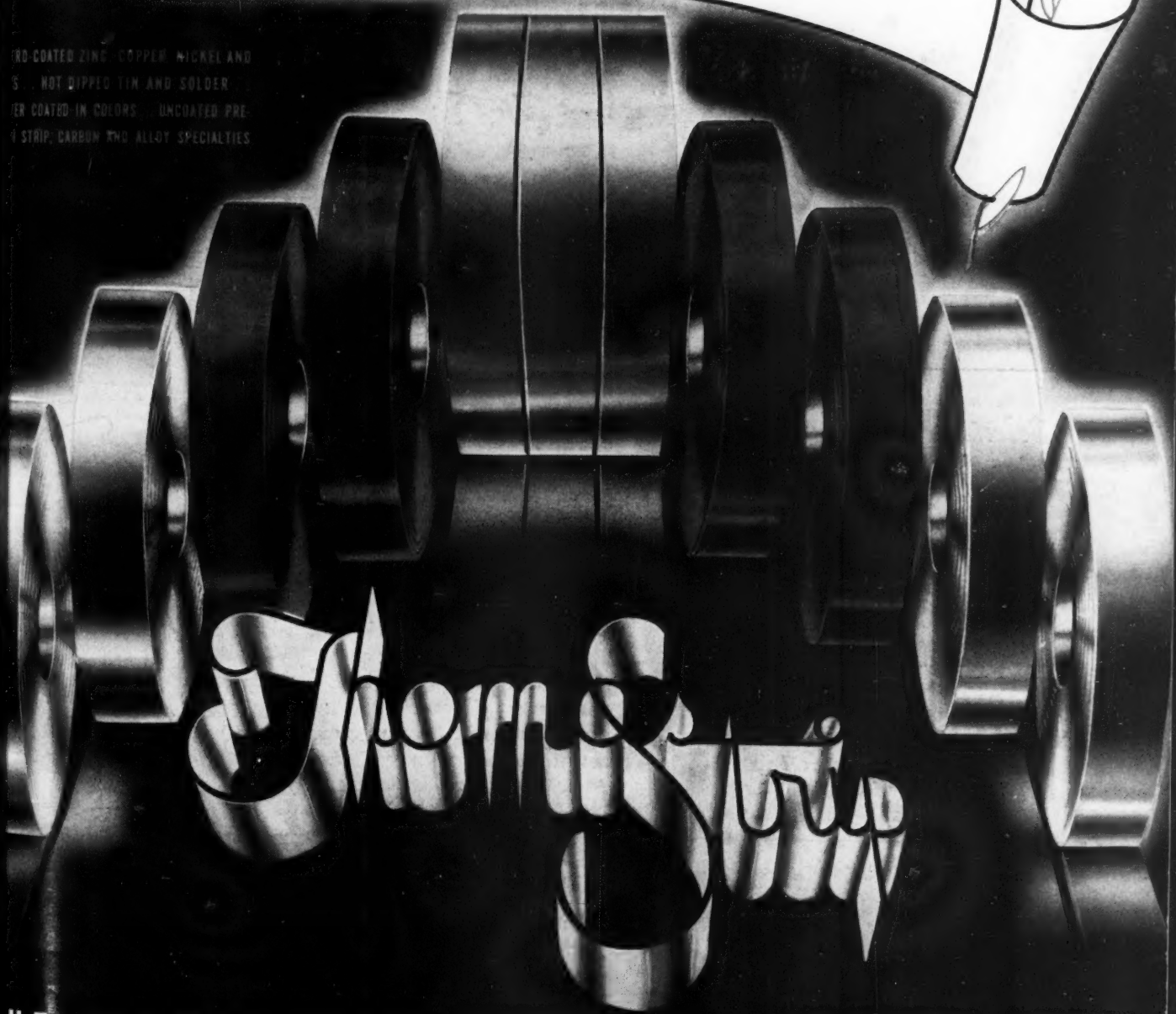

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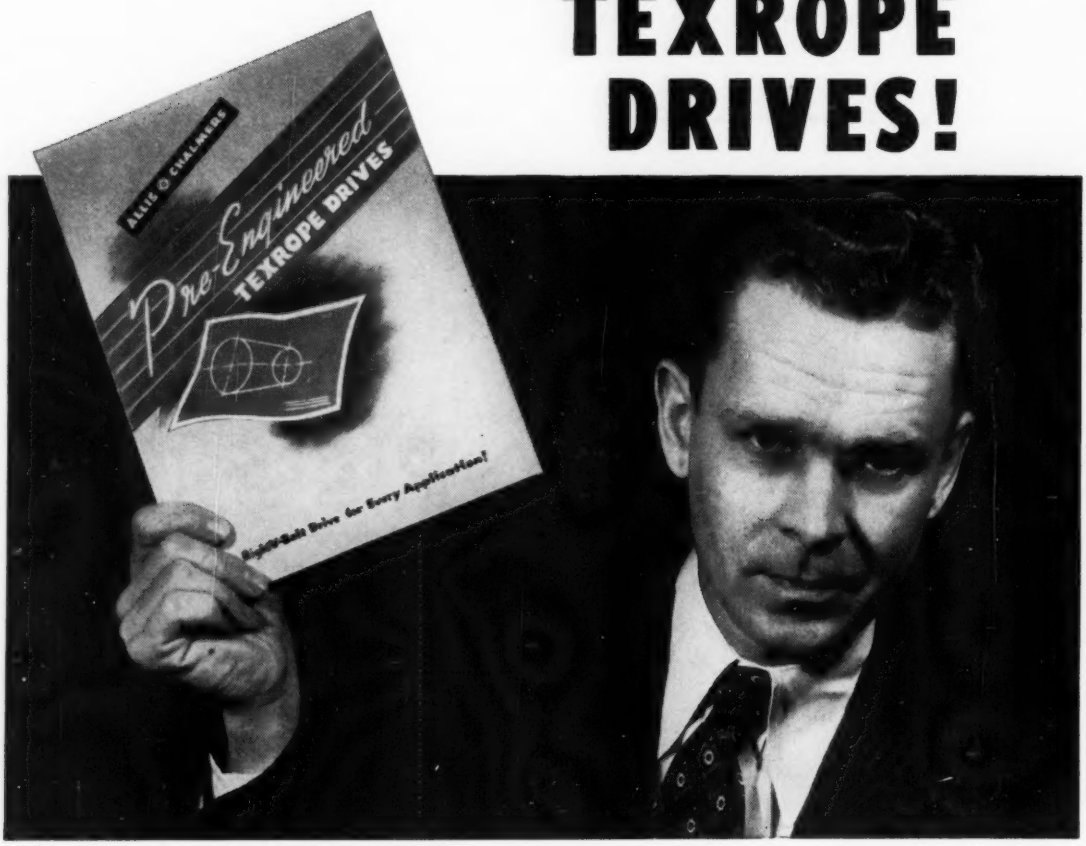

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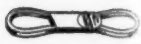

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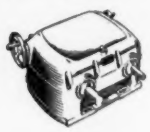

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VOL. 122, NO. 7 FEBRUARY 16, 1948

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February 16, 1948

Why Formal Allocation?

Exports from the United States in 1947 totaled $14.5 billion, a new record. Included among these exports were more than 6 million net tons of semifinished and finished steel. This total is in sharp contrast with the normal prewar exports of about 2 million tons of steel per year.

It is interesting to look at the Marshall Plan from the standpoint of these 1947 steel exports. Apparently nobody knows exactly how much steel will be required for ERP. Secretary of Commerce Harriman was questioned persistently on this point at a recent press conference. Asked how much steel may be called for under the voluntary allocations program, he said he could not make even an approximate guess. So far, he vouchsafed, steel allocations will call for about 1 million tons more steel in 1948 than in 1947. Beyond that, he finally estimated that total allocations above present consumption would come well under 10 per cent of present production (about 6.5 million tons). This last was a reluctant reply and probably was heavily weighted for safety.

However, the point is that as yet there are no definite indications that the amount of steel required directly or indirectly for ERP will exceed by any great margin the amount of steel exported direct or in the form of manufactured products in 1947. We may change considerably the proportion of steel that goes abroad in rolled steel form, but the total required in whatever form in 1948 may not exceed that of actual 1947 performance by a tonnage large enough to justify the furore that is being raised regarding the necessity for an elaborate voluntary allocations system, to say nothing of the mandatory controls which the administration continues to say are necessary.

We suggest that before the present plans for setting up extensive allocation machinery are carried out, somebody determine whether or not the actual job of allocating steel for ERP is going to require such machinery.

A record breaking volume of steel and manufactures of steel went abroad in 1947 without benefit of complicated formal allocations. Why can't the job be handled that way in 1948, so that production will not need to be throttled down to the slow pace of Washington supervision?

* * *

A NEW LOOK AT WAGES: Continued weakness in the commodity markets could affect negotiations for third round wage demands to a marked extent.

A few weeks ago experienced observers of wage negotiations were saying that the unions would ask for increases of from 20 to 30 cents an hour, or equivalent in fringe concessions, and finally would settle for increases of 10 or 12 cents, or equivalent. Today these students of wage bargaining are not so sure that even these reduced demands will be granted.

For one thing, the unions have not been on entirely safe ground in asking for wage increases based upon the cost of living argument. In numerous instances it can be proved definitely that wage increases have outdistanced advances in the cost of living. The present softening of some commodities at retail, such as bread, butter, shortening, bacon and flour, greatly weakens this already shaky argument.

Unions also have been banking heavily on the ability-to-pay argument, which seemed attractive superficially because of industry's re-

(OVER)

AS THE EDITOR VIEWS THE NEWS

cent good earnings records. At the moment this argument is weakened by the bearish condition of the stock market, which is languishing in sympathy with the unsettled commodity markets.

As a result of these recent developments there may be a period of watchful waiting, during which both parties to third round wage negotiations will try to adjust their positions to whatever new economic situation ensues. In any event, it is certain that employers and employees this year will not almost automatically take wage advances as a foregone conclusion, as they have done in the early months of the past few years. —pp. 56, 58, 137

* * *

SNAIL-PACE JUSTICE: Observers in Washington are beginning to fear that the newest case of the Federal Trade Commission against the pricing system employed in the steel industry will develop into another of the endless legal marathons that have become characteristic of antitrust litigation.

As in most suits of this kind, the government's attorneys seem to be unaware of the tremendous amount of detail that it is necessary to explore if a pricing system is to be examined fairly. As a result, trial attorneys for the commission usually underestimate the time required for presenting evidence. This, combined with numerous other delays, usually means that an antitrust case may drag on for months, years and even decades before a definite decision is reached.

The famous Pittsburgh Plus cease and desist order against United States Steel Corp. and its subsidiaries was issued in 1924. Even now—24 years later—it is still several sturdy legal steps removed from its final court test. We wonder just what is gained by anybody by this habit of dragging out antitrust suits over such absurdly long periods of time! —p. 53

* * *

PRE-ELECTION INSANITY: Latest word from Washington is that taxpayers should not expect much of a cut in the President's budget of $39.7 billion.

While the House approved a cut of $6.3 billion, the Senate is likely to restore a large portion of it. Also both houses have approved sizable appropriations which were not included in the President's budget. Senate leaders believe the maximum cut that can be expected will be about $2.5 billion. Even economy-minded Senator Byrd of Virginia seems resigned to the likelihood that "increase—not decrease—in federal personnel is to be expected in the remainder of the fiscal year on the basis of present prospects."

This is a deplorable situation. Is it too much to hope that at some future time we can elect Democratic and Republican members of Congress who can manage to remain sane during election years? —p. 60

* * *

PEACETIME BAZOOKA: Blast furnacemen are watching with interest experiments with explosives for opening iron notches. The iron notch is drilled out with a 2½-inch bit until the skull is encountered. A projectile-shaped unit about 1 foot long and 2 inches in diameter containing two ounces of explosive is inserted and exploded electrically. The action is similar to that of a bazooka.

This method has been used successfully several times by one steel company, which intends to shoot 40 additional notches at blast furnaces and 10 tap holes of open-hearth furnaces. If these experiments are successful, an explosives company will begin the manufacture of the projectile or jet caster on a commercial basis. —p. 107

* * *

EFFECT PSYCHOLOGICAL: It is too early to appraise the full effect of commodity price weakness upon iron and steel markets. To date almost all industry spokesmen declare that the immediate effect is or will be largely psychological. In their opinion the break will cause buyers to be more cautious, management to scrutinize expansion programs more critically and operating officials to be more concerned about break-even points.

Traditionally the industry looks to the sensitive scrap markets to be one of the first to reflect repercussions of a major economic break. Today scrap prices are under pressure because buyers, having bought heavily recently, now are staying out of the market. However, the fact that a mill interest a week ago was able to purchase 200,000 tons of steelmaking scrap at $40.50, Pittsburgh, would indicate that sellers' confidence in a continuation of the upward trend in scrap prices has been weakened. —p. 137

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

PRICES VS. WAGES—Metalworking executives are watching carefully developments in the commodity markets as they prepare to enter into negotiations with the unions on third round wage demands (p. 56). Whereas moderate wage increases were considered likely a few weeks ago, management is now adopting a more cautious attitude. Should the recent market break start a substantial decline in cost of living items, and possibly encourage price resistance in hard goods lines, the chances of wage increases will be considerably lessened. This may necessitate labor and management co-operation to find some inexpensive face-saving concessions for the unions.

FOREIGN TRADE—Despite tighter import controls effected by many countries and the dollar shortage, United States exports (p. 64) reached a new high of $14.5 billion in 1947. Imports totaled $5.7 billion. Steel exports for the first 11 months amounted to 6,032,547 net tons.

INDUSTRY AND THE PUBLIC—The people's attitude toward the steel industry is much improved over what it was a year ago. This results largely from the industry's expanded public relations program (p. 60) under which facts and figures on capacity, production and expansion have been given wide circulation. This has offset attacks on the industry by left wingers who had charged steel producers were fostering a doctrine of scarcity. The petroleum industry is studying the success of the steel program and steps to clarify the oil situation may be forthcoming.

LEGAL MARATHON—The Federal Trade Commission's hearing on steel industry pricing policies has settled down to what promises to be a long and tedious hearing, possibly extended over many years (p. 53). Attorneys point out that the less complicated cement basing point case dragged out over a decade and that the steel case may take as long or longer.

FAIR DAY'S WORK—Specially trained union stewards will process time standards grievances at the Kaiser-Frazer Detroit Engine plant in a move to give the union more direct participation in determining what constitutes a fair day's work (p. 67). The experiment is being watched carefully by other automotive plants, which long have been beset by disputes involving speed-ups and slow-downs.

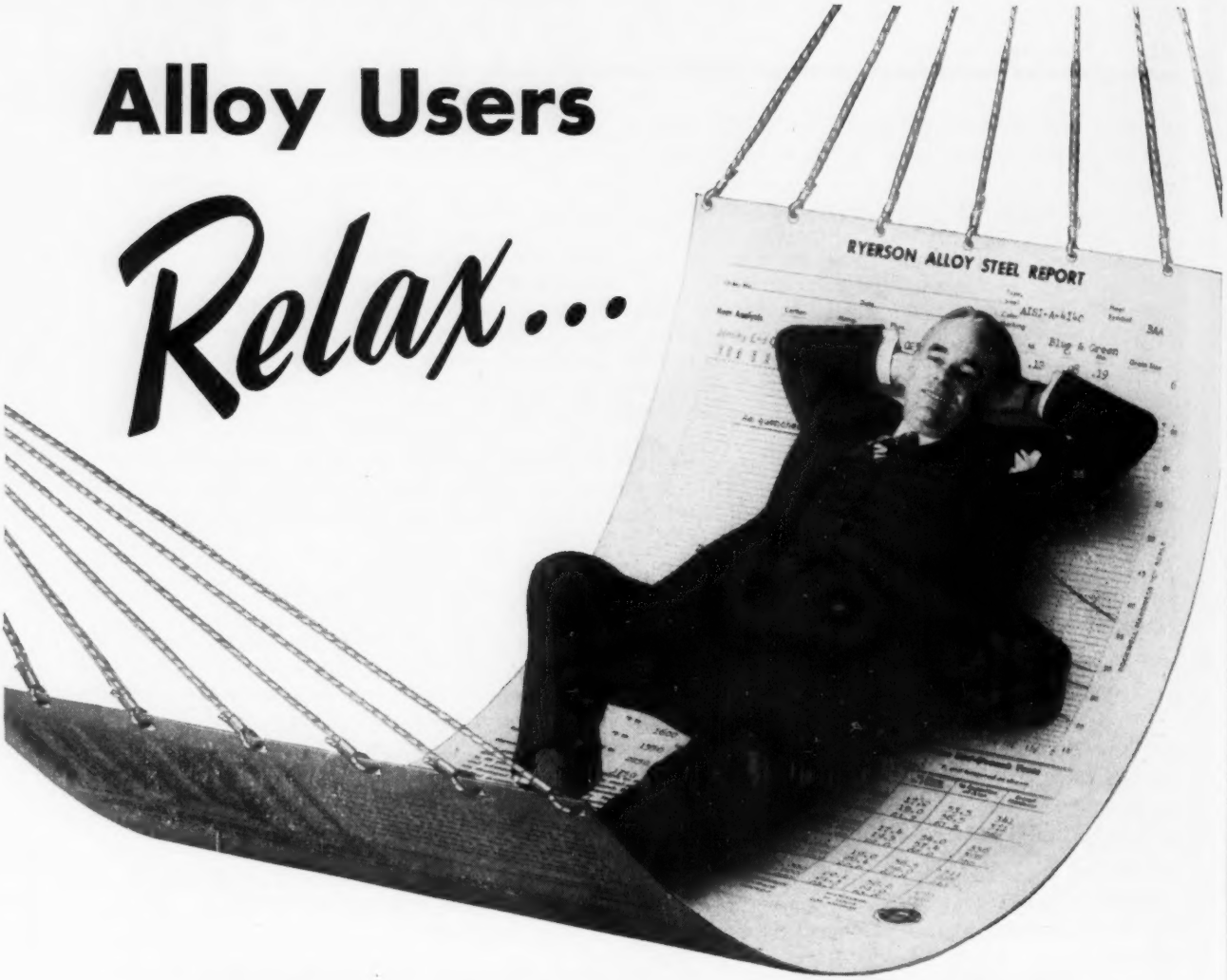
INDIA EXPANDS—Plans for two new major steel plants, which will add a million tons to India's steel producing capacity, are revealed (p. 63) by the Indian government. A shortage of steel has seriously handicapped the country since the war. Demand is two and a half times as great as production and imports have been negligible.

TAXES—Tax reduction plans are expected to be modified sharply by Congress (p. 60). One reason is the skidding commodity market, which, if continued, will wash out considerable inflation in income and reduce the government's tax take. Senators doubt that the President's budget can be trimmed more than $2.5 billion. Tax action may be held up pending a vote by both houses on the European Recovery Program, expected by the end of March.

SIGNS OF THE TIMES—Severe cold has hampered industrial production (pp. 67, 72) by necessitating curtailment of gas supplies to plants. . . . Indications are the St. Lawrence seaway project will be defeated again this year (p. 62). . . . Pig iron and farm machinery industry advisory committees have been set up under the voluntary allocations program (p. 55). . . . A new lightweight tractor has been introduced (p. 68) by the Frazer Farm Equipment Corp. Unit weighs only 1020 pounds and is designed especially for use with a rotary tiller. . . . British steel export prices have been raised $1 to $1.20 a ton (p. 63) . . . Chevrolet will open its new West Coast assembly plant at Los Angeles (p. 67) this month. . . . Much publicized wartime personnel program of Jack & Heintz (p. 70) has been carried over in part to peacetime with salutary effects on productivity, low absenteeism and low turnover rate.

Engineering News, P. 81 *Market Summary, P. 137*

Alloy Users *Relax...*



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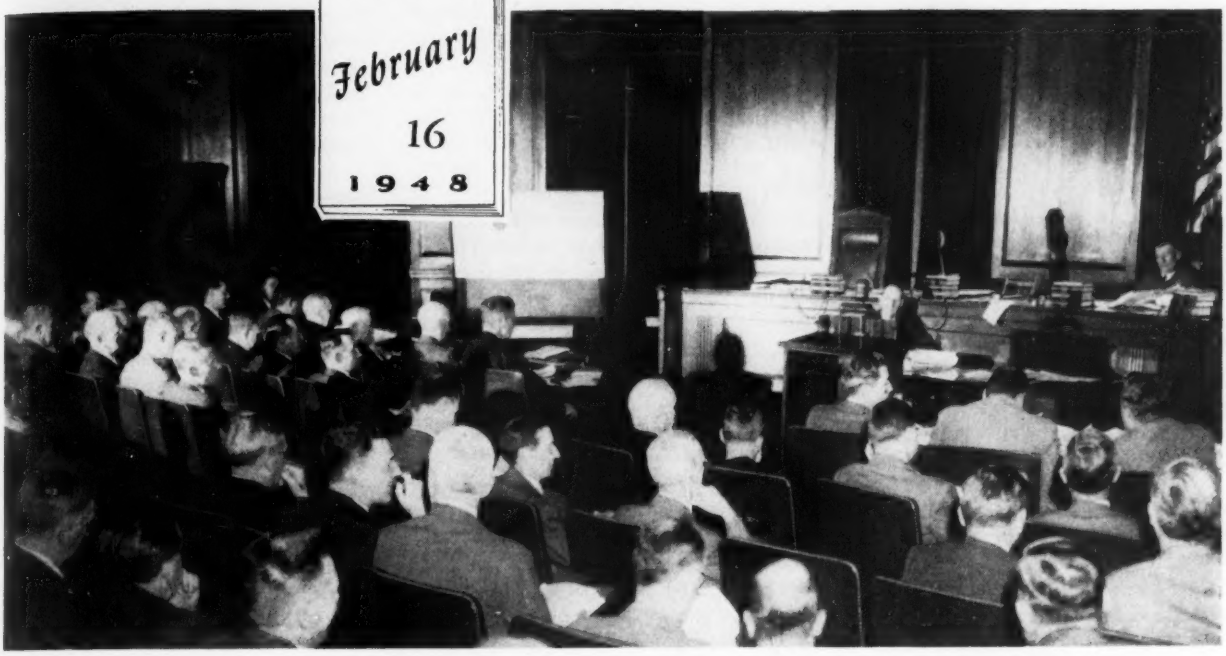


Opening day at FTC hearings in the steel case was attended by representatives from almost all respondents concerned. Proceedings now are in a smaller room with attendance ranging from 25 to 50. Trial Examiner Frank Hier is shown on the bench

FTC Steel Hearing Seen Another Legal Marathon

Taking of testimony expected to extend over many months, possibly years, with limitless opportunities present for consideration of broad areas of subject matter involving many products and an intricate pricing system

By E. C. KREUTZBERG
Washington Editor, STEEL

FEARS are beginning to be expressed that the Federal Trade Commission's new case against the pricing system in the steel industry may develop into another of the endless legal marathons that have become characteristic in the field of anti-trust law actions.

On Feb. 6 the steel hearing was adjourned until Feb. 17, on which date it is expected John L. Neely, procurement analyst, Tennessee Valley Authority, Knoxville, Tenn., will resume testimony. He already has identified certain TVA documents, particularly abstracts of bids on steel requirements, and he will be recalled for cross-examination. This is the second adjournment since the hearings started Jan. 12.

Lynn C. Paulson, the commission's trial attorney, said prior to the start of hearings that he hoped to get his whole case on the record prior to the summer vacation period this year. But the way things are going it is clear that this expectation is doomed to disappointment.

Long-Drawn-out Case — It is recalled that the cement case, involving charges of collusive use of a multiple basing system and of price discrimination in only one standardized product, has taken 10 years since its inception and still is awaiting decision by the United States Supreme Court.

The steel case, on the other hand, offers plenty of opportunity for investigations over limitless areas of subject matter. Not only are a large number of products and an intricate pricing system involved, but opposing counsel can seek their evidence from sources galore.

It all depends on the type of case the commission wants to develop. There is ground for belief, for example, that much attention will be given to the charge that steel industry pricing policies have prevented more rapid industrialization of the western states. If that is the case many months could be devoted, along with thousands of miles of travel, to this one feature of the commission's amended complaint.

Nearing Court Test — Just to show what is possible in matters of this kind, the famous Pittsburgh Plus case which originated with the commission's order against the United States Steel Corp. and its subsidiaries way back in 1924, only now is nearing its court test. By order of the Court of Appeals for the Third Circuit, Philadelphia, U. S. Steel counsel is to file its final brief by the end of February. The Federal Trade Commission—with the usual 90 days' allowance—is to get its brief in by the end of May. In turn, the Steel corporation has until June 10 to get in its reply brief. Next will come oral argument, at a time not yet designated. Later on will come the Circuit Court's decision and only after that will the case be ready to go to the Supreme Court.

The new case, which generally is referred to as the "steel case," gives indications of hard fighting ahead. Trial Attorney Paulson's expectation of making rapid progress in developing his case so far has been vitiated by the refusal of steel counsel to take anything for granted. Sharp exchanges, in fact, took place on the fourth day of hearings, over two exhibits, 122 and 123, which will loom importantly in the government's case.

Extra Lists Involved — These exhibits are lists of steel extras compiled by the United States Navy and they contain the extras which the Navy recognizes as valid on its

purchases of steel. The witness, A. B. Custer of the Bureau of Supplies & Accounts, said the reason for compiling the official Navy list of extras was that it was cumbersome and confusing to attempt to use the extra cards of the various steel companies. So the Navy looked over all these cards and set up its own list of the prevailing extras.

He further explained that this extra list was a very valuable procurement tool, since the Navy often bought ahead of time, before it knew just what it wanted in the way of analyses, dimensions or quantities. So it awarded its contracts on the basis of base prices quoted in competitive bidding, with the extras or deductions to be added or subtracted when shipments later were made against definite specifications.

The commission, of course, introduced these exhibits to prove its claim that the steel industry quotes identical or "matching" prices to the government. But by the time the steel attorneys got through with these exhibits—and then only for the duration of the present phase of merely introducing the exhibits—a lot of questions had been raised.

Unfamiliar With Details — For instance, Mr. Custer admitted that while the extra lists had been compiled under his supervision, he did not recall who made them, did not know what details were involved, why they were prepared as of certain dates, nor how many revised lists the Navy compiled during the period of this case—May 27, 1935, through Aug. 19, 1947.

Steel attorneys were stopped when they attempted to go further with their questioning. Steel spokesmen objected to these two exhibits—compiled in August and November of 1940—as constituting incomplete and fragmentary evidence; they demanded introduction of all the extra cards compiled by the Navy during the period covered by the case. Mr. Paulson said the explanation was simple, that 1940 was the latest year in which steel companies put in competitive bids on Navy proposals and that there have been no bids on any of the proposals issued by the Navy during or since the end of World War II. But questions of this type will come up again later on when the contents of the exhibits, rather than the circumstances surrounding their preparation and introduction, come up for cross examination.

Questioned on Quoting — Another chain of questions that was interrupted by the examiner sought to elicit an admission from Mr. Custer that the historic method of quoting steel prices—using base prices plus extras—is a good one in the opinion of the Navy. In fact, an admission was sought that the Navy, by its use of a list of extras as a contract stipulation, encourages or even compels steel companies to quote base prices to which extras later must be added when definite specifications are made known. This particular angle will come up for cross examination later on.

Mr. Paulson introduced a flock of photostats of Navy records of bids submitted on various dates, the purpose being to show identical or "matching" bids. But, in the face of heavy fire from steel counsel, he withdrew them for presentation later on when he will produce the original documents and also the people who handled or actually prepared these documents. The steel men established the fact that Mr. Custer had not done all this work himself, even though it was under his supervision, and they demanded the production of witnesses who could answer detailed questions.

Steering Group Formed — When hearings opened on Jan. 12 in the beautiful walnut-paneled main auditorium in the Federal Trade Commission building, attorneys representing practically all respondents were on hand. So were some of the steel industry figures—a few men like Walter S. Tower, president, American Iron & Steel Institute. The trial examiner warned that some sort of a representative arrangement would have to be made to prevent disorder, confusion and duplication in the oral proceedings. The result was the formation by the steel counsel of a "steering" group which sits at a front table and acts for all respondents.

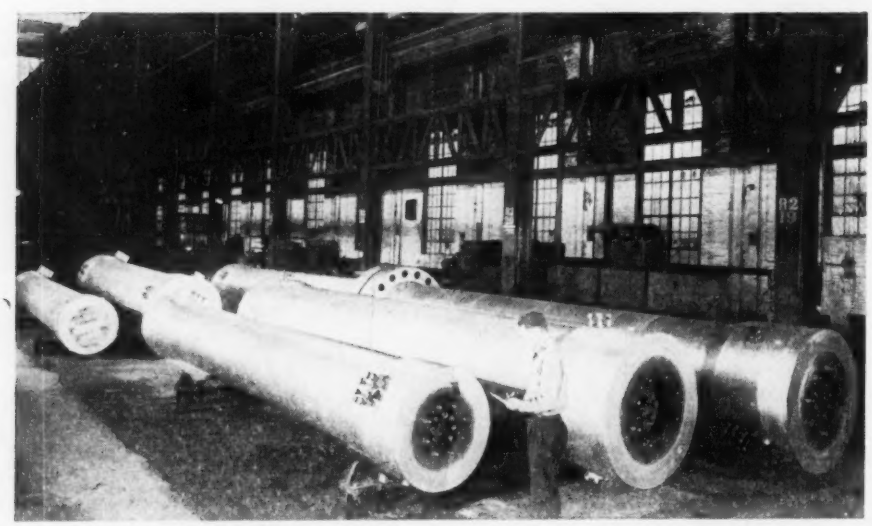
The members of the "steering" group and the clients they represent are Taggart Whipple, American Iron & Steel Institute; Judge Elder W. Marshall, United States Steel Corp. and subsidiaries; Hoyt A. Moore, Bethlehem Steel Co.; Thomas F. Patton, Republic Steel Corp.; H. Templeton Brown, Inland Steel Co.; and John C. Bane Jr.

It is Mr. Bane's special chore to represent the "small" companies in this case. A well-known member of the Pittsburgh bar, he represents directly these clients: Crucible Steel Co. of America, Sharon Steel Corp., Pittsburgh Steel Co., Superior Steel Corp., Anchor Drawn Steel Co., Columbia Steel & Shafting Co., Latrobe Electric Steel Co., Mercer Tube Co., Wyckoff Drawn Steel Co. and Vanadium-Alloys Steel Co.

John W. Davis who is the American Iron & Steel Institute's chief counsel was there in person on the opening day but has been away from the hearings since, his representative at the trial being Mr. Whipple.

Hearing Runs Smoothly—Trial Examiner Frank Hier deserves a word for his conduct of the hearings. He runs things smoothly and with a firm hand—with a touch of humor now and then to offset his customary austere manner. His determination to be fair was demonstrated when he cracked down on Mr. Paulson for interrupting cross examination in order to read to Mr. Custer some testimony given by the latter on the previous days. "I will not tolerate putting words in the mouth of a witness," ruled Mr. Hier. "Witness will answer questions without the help of prompting from counsel on either side."

Mr. Hier has been with the Fed-



PRESSURE VESSELS: Five of a group of forged seamless pressure vessels recently completed for export at the Bethlehem, Pa., plant of Bethlehem Steel Co. The vessels will be used in the production of synthetic chemicals

eral Trade Commission for 12 years. He has been a trial examiner for two years, having served in the famous Corn Products Refining and A. E. Staley cases involving glucose pricing. Before that he was an associate counsel in a number of so-called "demonstrator" cases in which the commission attacked the practice of some cosmetics manufacturers to supply "sales demonstrators" to certain preferred customers like department stores and leave smaller retailers to shift without such aid.

In these hearings, incidentally, Mr. Hier is following the usually employed procedure in federal equity cases. This is along lines of equity proceedings before a judge rather than along the lines of trying a common law case before a jury. Mr. Hier told counsel at the outset that he is going to make all bench rulings without delay and that when, due to his "inability to understand," he needs to make some personal investigation, he will declare a recess to allow himself the necessary time. In other words no loose ends will be allowed to hang over the hearings and create confusion.

Pig Iron Allocation Discussed

Industry advisory board to be named. Supply for freight car program under consideration. Labor group discusses allocation plans with government representatives

STEEL allocations program continued to shape up slowly last week. Most important development of the week was meeting of pig iron producers with Commerce Secretary Harriman at which iron production and supply were discussed in a general way.

Prior to the pig iron meeting the allocations program was discussed with representatives of labor.

At the meeting with representatives of the CIO, AFL and other labor organizations, Secretary Harriman emphasized the interest of the Department of Commerce in seeing that labor is thoroughly informed on the program and requested the labor organizations to indicate the best form in which labor's interest could be expressed.

The labor representatives agreed to submit their views.

John C. Virden, OIC director, outlined the operations of the Office of Industry Co-operation and the program which his office is now working on.

At the meeting with the representatives of the pig iron producers the general voluntary allocation program was outlined and the industry representatives agreed to submit a list of trade leaders from which could be picked an industry advisory board. Pig iron requirements for the freight car program were discussed in some detail, government spokesmen pointing out that there has not been enough iron available to support the 10,000-car monthly program projected.

The Pig Iron Industry Committee consists of the following:

C. E. Hilkert, Republic Steel Corp., Cleveland; C. F. Hocker, Bethlehem Steel Co., Bethlehem, Pa.; William Kerber, Hanna Furnace Corp., Detroit; James MacBeth, Carnegie-Illinois Steel Corp., Pittsburgh; Arthur C. Engh, Inland Steel Co., Chicago; E. C. Thompson, Colorado Fuel & Iron Corp., Denver.

George W. Striebing, Pickands, Mather & Co., Cleveland; H. M. Wilson, Shenango Fur-

(*Please turn to Page* 159)

Present, Past and Pending

■ TO ASK PROBE OF STOCK DEAL CANCELLATION

NEW YORK—Henry J. Kaiser, chairman, and Joseph W. Frazer, president, Kaiser-Frazer Corp., announced last week they plan to ask complete investigation of recent cancellation by an underwriting syndicate of a contract to purchase and market 900,000 shares of Kaiser-Frazer common stock.

■ FOOD MACHINERY CORP. BUYS VIRGINIA PLANT

WOODSTOCK, VA.—Grabill Mfg. Co., this city, has been purchased by Food Machinery Corp., San Jose, Calif. The Grabill plant, which will be operated as a branch of Food Machinery's John Bean Mfg. Co. Division, will continue to make apple packing equipment and expand its list of packing house products.

■ BILLION DOLLAR AIRPORT PROGRAM RECOMMENDED

WASHINGTON—Civil Aeronautics Administration's 1948 national airport plan recommends construction of 2745 new airports and development of 2090 old ones during the next three years. Estimated cost of the projects would be $1,048,500,000.

■ MANUFACTURERS' SALES UP THIRD OVER 1946

WASHINGTON—Manufacturers' sales in 1947 are estimated by the U. S. Department of Commerce at $169 billion, exceeding 1946 by a third. Increase represents both a gain in volume and price inflation.

■ MOTORS ORDERED FOR ATOMIC ENERGY PLANT

PITTSBURGH—Westinghouse Electric Corp. has received from the Atomic Energy Commission an order for $467,000 worth of electric motors for use at the Hanford, Wash., atomic energy plant.

■ SCRAP CONSUMPTION FIGURES REPORTED

WASHINGTON—Consumption of iron and steel scrap in September, 1947, is estimated at 4,373,000 gross tons, a report released last week by the U. S. Bureau of Mines shows. Scrap consumption by steel furnaces that month declined 2 per cent from August, while in gray iron foundry cupolas it rose 17 per cent.

Improvements Cost Steel Industry $1.7 Billion

Postwar expansion and improvement programs of steel companies involve record-breaking expenditures totaling nearly $1.7 billion, according to latest reports to the American Iron & Steel Institute, New York.

From V-J Day to the end of 1948, the combined cost of the programs is estimated at $1.4 billion. Beyond 1948, steel companies have already allocated about $265 million for new equipment and expansion. This amount is expected to rise, since not all companies have yet planned their 1949 expenditures. During 1948, the steel companies plan to spend an aggregate of $565 million for new equipment and expansion.

The $1.7 billion program raises to $3,805,000,000 the total amount of money spent and allocated since 1935 by steel companies to expand and improve plants. The latter amount is 26 per cent larger than the estimated net income of the entire industry in the period 1935-1947.

The industry's postwar program is higher than the $1,310,000,000 it spent from its own funds for wartime modernization and expansion.

Unions' Wage Hopes Dimming

Industry to be cautious in granting increases until commodity market break can be more carefully appraised. Steel wage demands being drafted by union

DEVELOPMENTS in the commodity markets may be the decisive factor in the 1948 wage contest.

Executives of the steel, automotive, electrical and other metalworking industries to be confronted with third round wage demands within the next few weeks are adopting a "wait and see" attitude. Two weeks ago many of them privately admitted that labor likely would obtain a moderate increase. Now they are not so sure.

Should continued weakness be indicated in commodity prices, a decline in food prices and other cost-of-living items would follow. Such a decline would eliminate the union's most powerful argument for the third round wage increases.

On industry's side, a weakening in the commodity markets might presage increased price resistance in hard goods and lead to a slackening in operations. This possibility is making management more aware of the high "break-even point" in today's operations, due largely to high labor rates. For many companies present break-even points are twice as high as they were before the war and a decline of 10 to 20 per cent in operations would drastically reduce the satisfactory profits enjoyed during the past year.

Steel Wage Demands Formulated—Meanwhile the unions continue to ready their campaign for the third round negotiations. This week the executive committee and the wage policy committee of the United Steelworkers of America—CIO are meeting in Pittsburgh to draft the demands to be posed to the steel producers and later to the nonbasic steel companies —those which have contracts with the steelworkers' union but which produce no steel. Grapevine reports indicate the steelworkers will come up with a demand for a straight wage increase of between 20 and 30 cents an hour, the higher figure being indicated.

Auto Workers Want 30 Cents—United Automobile Workers already have indicated they will ask about 30 cents an hour. This will include a straight wage increase of about 15 cents, 10 cents for a pension program, 5 cents for insurance and possibly one cent for other benefits.

These are the asking demands and the union leaders have indicated they will bargain on them.

The leftist-dominated United Electrical Workers have asked a "substantial" wage increase from the larger electrical companies. Only hint of how much of a wage increase will be asked is contained in the union assertion that purchasing power of weekly wages have declined $13.03 in the past year. The electrical workers have indicated they will seek a large assortment of fringe benefits, including more liberal vacations, call in pay, larger holiday pay, increased overtime, etc.

Wages Only Steel Issue—An important difference exists in the coming steel wage negotiations, as against those for the automotive and electrical industries. In 1947, Big Steel signed two-year contracts with the steelworkers' union with a provision that the contracts could be reopened in 1948 for negotiations on a "general and uniform change in rates of pay." This provision appears to limit the steel negotiations to wage rates only and to exclude consideration of fringe issues.

The contracts between United States Steel Corp. subsidiaries and the union can be reopened Apr. 1, with negotiations to start five days later. If no agreement is reached by Apr. 30, the contract continues in effect until Apr. 30, 1949.

In the electrical industry, negotiations are now underway between Westinghouse Electric Corp. and the union in Pittsburgh. It is reported, however, that the union may seek to force an agreement first with General Electric Co., with whom negotiations are to start soon in New York.

In the automotive industry, negotiations may start with General Motors late in March or early April, with Chrysler after 30 days' notice. The Ford contract runs until June. General Motors employees, with still painful memories of the 112-day strike two years ago, are reported to have implored UAW President Walter Reuther not to make GM guinea pig in any wage contest this year.

PRODUCTION PAUSES: These workers at the Dodge plant in Detroit were forced to leave their jobs as the severe cold wave caused curtailment of gas supplies. NEA photo

Ask Local Bargaining—The nonbasic steel companies, or those which have labor contracts with the United Steelworkers but which produce no steel, generally will come up for negotiation after the union-Big Steel settlement. Last year the nonbasic companies rebelled against signing the basic steel contract and insisted, with considerable success, that their contracts should be negotiated at the local plant level, taking into consideration competitive and local conditions. Even greater insistence on local bargaining is expected from the nonbasic companies this year.

Industrial relations directors of

these smaller companies have been "boning up" on the techniques of bargaining. Industrial relations institutes have been inaugurated in several cities. In Cleveland, for example, a series of collective bargaining forums are being held at Fenn College under the auspices of the chamber of commerce and local personnel and industrial relations associations.

Two Arguments—The labor unions are basing the case for a third round wage increase on just two arguments: 1) The increase in the cost of living; and 2) the ability of industry to pay on the basis of 1947 profits.

For the record, the consumers' price index (cost of living) index increased from 156.1 in April, 1947, to 167.0 for December, latest figure available.

The union wage campaign has been carried on rather quietly to date, with less beating of the drums in the labor press, fewer inflammatory statements by union leaders, than in past years.

Public opinion polls indicate the union worker has become disillusioned as to the benefits of his first two postwar wage increases and now is more interested in seeing the cost of living turn downward.

However, wage demands have been made, negotiations are underway in some cases and arrangements have been made for others. Should commodity market developments reverse the upward trend in living costs and increase resistance to the third round wage demand, union leaders soon may be hunting for some inexpensive, face-saving concessions as a basis for settling 1948 contracts.

New J & L Cold Strip Mill Undergoes Test Runs

Test runs of the new cold strip mill of Jones & Laughlin Steel Corp., Aliquippa, Pa., mark it as the world's fastest 5-stand tandem cold mill. Driven by the most powerful electrical system ever installed on a tandem mill, the installation operates at 6250 feet per minute, or 71 miles an hour, which is more than four times faster than tandem cold strip mills built in the last decade. It represents the greatest advance yet made in the continuous cold rolling of steel strip.

Output of the mill will consist mainly of tin plate gages ranging from 0.008 to 0.015-in. thick. In addition, it is designed to roll up to 0.025-in.-thick material.

Hot coils up to 30,000 lbs, 66 in. diameter, and from 0.095 to 0.109-in. thick are fed to the first stand. After passing successively through the five stands of 4-high rolls, the strip is delivered under tension to the reel reduced to about 0.009-in. thick and elongated about nine times.

The 6-mill and reel motors built by the General Electric Co., Schenectady, N. Y., have a total nominal capacity of 16,850 horsepower which is the most available horsepower ever connected to a single cold rolling mill. Twin motors are used to drive top and bottom work rolls separately. Double-armature twin-drive motors are used on the last stand to reduce the energy stored in the rotating parts to a minimum.

The new X-ray thickness gage, described in the Feb. 2 issue of STEEL, page 101, permits accurate measurements at the high speeds. A complete description of the new tandem mill will be presented in the Feb. 23 issue of STEEL.

Ingersoll-Rand Reveals Fast Open-Pit Mining Drill

Complete demonstration of the Quarrymaster, Ingersoll-Rand Co.'s latest development for strip, open pit mining and quarry work was witnessed by editors of the nation's leading business journals Feb. 5, at the company's plant in Phillipsburg, N. J. During the demonstration, the huge 42,000-pound self-propelled unit drilled through 47 feet of tough blue limestone in a matter of 3 hours and 29 minutes. This was at a rate of 13.4 feet per hour.

Huge drill, capable of drilling 6-in. diameter holes to a depth of 70 feet at high speed, is a packaged portable drilling unit mounted on tractor treads. It is highly maneuverable.

Mounting an air-operated, piston type rock drill that strikes more than 200 blows per minute, the machine derives its penetrating power through a patented valve action and power cycle that insures maximum efficiency and drilling speed.

In drilling, the bit is automatically rotated by a mechanism which turns it into a fresh cutting position for each blow. Thus, in effect, the machine is a rock-cutting rather than a rock-crushing unit. Cuttings are removed with each blow to insure maximum cutting efficiency by passing compressed air down through the hollow drill steel, forcing chips up to the surface through the space between the steel and walls of the hole.

Calendar of Meetings . . .

Feb. 16-18, American Management Association: Conference and exposition on labor-management relations, Palmer House, Chicago. Association headquarters are at 330 W. 42nd St., New York.

Feb. 28, Chicago District Enamelers Club and **Chicago Section of American Ceramic Society:** Joint meeting, LaSalle Hotel, Chicago.

Feb. 28-Mar. 5, Canadian Automotive Wholesalers Association: 1948 convention in Vancouver, B. C. Association secretary-manager is L. N. Panneton, 295 Albert St., Ottawa, Canada.

Mar. 1-4, American Society of Mechanical Engineers: 1948 spring meeting, St. Charles Hotel, New Orleans. Society headquarters are at 29 W. 39th St., New York.

Mar. 1-7, American Society for Testing Materials: ASTM committee week in Washington. Society headquarters are at 1916 Race St., Philadelphia.

Mar. 4-5, Purdue University Welding Conference: 19th annual affair, on university campus at Lafayette, Ind.

Mar. 8-9, National Association of Purchasing Agents: Midyear public utility group meeting, Roosevelt Hotel, New Orleans.

Mar. 11-12, Ohio Regional Foundry Conference: Sponsored by Northeastern Ohio Chapter of AFA and Case Institute of Technology, at Case in Cleveland.

Mar. 15-19, American Society of Tool Engineers: Sixth industrial exposition and 16th annual convention, Public Auditorium, Cleveland. Society headquarters are at 1666 Penobscot Bldg., Detroit.

Mar. 17-18, Export Managers Club of New York: 28th annual meeting, Hotel Pennsylvania, New York. Club headquarters are at 2 Lafayette St., New York.

Mar. 22-24, Chicago Technical Societies Council: Chicago production show, Stevens Hotel. Executive secretary of the council is Paul A. Jenkins, 53 W. Jackson Blvd.

Mar. 23, American Supply & Machinery Manufacturers' Association and National Supply & Machinery Distributors' Association: Joint regional meeting, Palmer House, Chicago

Mar. 28-31, West Coast Section, Society of the Plastics Industry: Annual conference and exhibit, Santa Barbara, Calif.

Apr. 5-8, National Association of Corrosion Engineers: Fourth annual conference and exhibition at Jefferson Hotel, St. Louis. Association headquarters are at 67 Wall St., New York.

Apr. 7-9, Midwest Power Conference: Tenth annual meeting sponsored by Illinois Institute of Technology at Sheraton Hotel, Chicago. Stanton E. Winston is conference director.

Apr. 7-9, American Society of Civil Engineers: Spring meeting, William Penn Hotel, Pittsburgh. Society headquarters are at 33 W. 39th St., New York.

Apr. 12-14, Open Hearth Steel and Coke Oven, Blast Furnace and Raw Materials Committees, Iron & Steel Division, AIME: 31st annual conference, William Penn Hotel, Pittsburgh.

Apr. 14-17, Electrochemical Society: Spring convention in the Deshler-Wallick Hotel, Columbus, O. Society secretary is R. M. Burns, 235 W. 102nd St., New York.

Apr. 15-16, Metal Powder Association: Fourth annual spring meeting and exhibit, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

Apr. 19-23, American Chemical Society: 113th national meeting, Stevens Hotel, Chicago. Society headquarters are at 60 E. 42nd St., New York.

Apr. 22-23, 1948 Machine Tool Forum: Hotel Statler, Buffalo.

Apr. 26-27, Association of Iron & Steel Engineers: Annual spring conference, Hotel Statler, Buffalo. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Apr. 26-30, American Management Association: 17th annual packaging exposition, Public Auditorium, Cleveland. Association headquarters are at 330 W. 42nd St., New York.

Wages Outrun Living Costs

Survey of five major metal trades groups in southern California shows that while cost of living rose 61.3 per cent the lowest wage rise was 73.7 per cent

LOS ANGELES

WAGES have outdistanced cost-of-living increases since the base date period, 1937-1939, a report covering the five major metal trades groups in southern California shows. Industries covered in the survey are gray iron foundries, steel foundries, oil tool and machine shops, and structural steel firms.

The exhaustive study was released by the Metal Trades Manufacturers Association, Los Angeles, through George O. Smith, association economist. It refers to figures of the Bureau of Labor Statistics and the U. S. Department of Labor as comparative bases in its computations.

"It should be noted," the report sets forth, "that when the term 'cost of living' is used in this study, reference is made to all items in the Consumers' Price Index.

"By the same token, in studying the wage earner's income it is necessary to use the composite picture (weighted average) of all production workers employed on an hourly rate basis."

Rise Is Shown — Breakdown of the report shows that overall living costs have risen 61.3 per cent since 1939. Within the same period, ending October, 1947, the following wage jumps, percentage-wise, have occurred within the industrial branches named:

Gray iron foundries, 96.1 per cent. This is the average of raises given to chippers and grinders, hand coremakers, molders of all types, wood patternmakers and sand mixers, both hand and machine.

Nonferrous foundries, same averages: 85.6 per cent.

Steel foundries, 84.9 per cent.

Oil tool and machine shops, 75.9 per cent.

Structural steel, 73.7 per cent.

In the same industries, hourly rate advances were computed in dollars and cents from past lows to present highs for the five industries in their respective order, as follows: Gray iron, 0.664 to 1.282; nonferrous, 0.687 to 1.275; steel, 0.724 to 1.339; oil tool and machine shops, 0.795 to 1.399; structural, 0.83 to 1.442.

In summary, the survey shows that weighted averages of hourly wages in all jobs in all industries rose from a low of $0.756 in 1937-1939 to $1.378 in October, 1947. This was 82.3 per cent, as against the cost-of-living increase of 61.3 per cent.

Steel Output Sets New January Peacetime Peak

Steel production in January set a peacetime record for that month, the American Iron & Steel Institute reported last week. Output of 7,463,112 tons of ingots and steel for castings was a quarter million tons over that in the same month in 1947. The only higher January production was the wartime output of January 1944, at 7,592,603 tons.

The steel operating rate during January averaged 93.5 per cent of capacity, against 93.0 per cent of the smaller capacity existing a year ago.

The average weekly tonnage during January was 1,684,675, compared with 1,628,272 net tons for the similar months of 1947, and 1,626,083 net tons averaged weekly during 1947.

Capacity of Bethlehem's Los Angeles Plant Raised

Bethlehem Pacific Coast Steel Corp., San Francisco, has placed in operation a new electric furnace at its Los Angeles plant. The furnace, which is the largest and most modern on the West Coast, raises capacity of the plant from 117,000 tons of ingots annually to over 200,000 net tons a year. STEEL previously (Jan. 12, p. 42) had incorrectly reported this plant as having a 7600-ton annual capacity which would be doubled when the new furnace was placed in operation.

Ford Contracts on West Coast for More Parts

Ford Motor Co., which plans to spend $60 million a year in the western states for automobile parts and components produced by western firms, has just awarded contracts to eight San Francisco Bay area firms.

Prospects Brighten on Coast

SAN FRANCISCO

STEEL CONSUMERS on the West Coast, still suffering acute shortages of many finished products, are heartened by production records established last month by two western subsidiaries of U. S. Steel Corp.

In Utah, Geneva Steel Co. during January produced 107,949 net tons of steel ingots and castings, well above the previous production record of 102,260 net tons set in December, 1947. Geneva also reports output of 56,059 tons of finished steel plates last month, a new record, comparing with the previous monthly peak of 53,919 tons in December.

Other divisions of the Geneva plant also stepped up production in January. For example, the Geneva coal mine turned out 146,983 net tons of coal, compared with 136,464 tons in December, the previous record month, and coke output rose to 161,729 tons from 153,655 in December.

Sets New Record — Geneva's Ironton plant set a new pig iron production record at 17,988 tons in January, compared with the previous peak of 17,973 in August of 1947.

At the same time, Columbia Steel Co., U. S. Steel's West Coast unit, reports that its Pittsburg plant, in the San Francisco area, produced 31,130 net tons of finished steel products in January for a new monthly record, topping the December, 1947, record when 29,319 tons were produced. Shipments of finished steel from the plant at 29,875 net tons were above the previous record of 28,381 tons in December, 1942.

Meanwhile, other developments in the western steel industry include a stepping up of manganese shipments to the Geneva plant.

Blackbird Mining Co. soon will be shipping a carload of manganese daily from its mine near Marysvale, Utah, to the Geneva mill. Since development work on the manganese deposit was started last October, the company has been shipping a carload of manganese weekly to Geneva.

Blackbird officials claim their development eventually will result in the mine becoming one of the largest manganese properties in the country.

Expansion Under Way — Another expansion of western steel production is under way at Ironton, Utah, where Kaiser-Frazer Corp. is preparing to enlarge the blast furnace operation which it recently purchased from the War Assets Administration. Ironton is 50 miles south of Salt Lake City and 10 miles southeast of the Geneva steel plant.

Higher Prices For Tools Spur Sales Activity

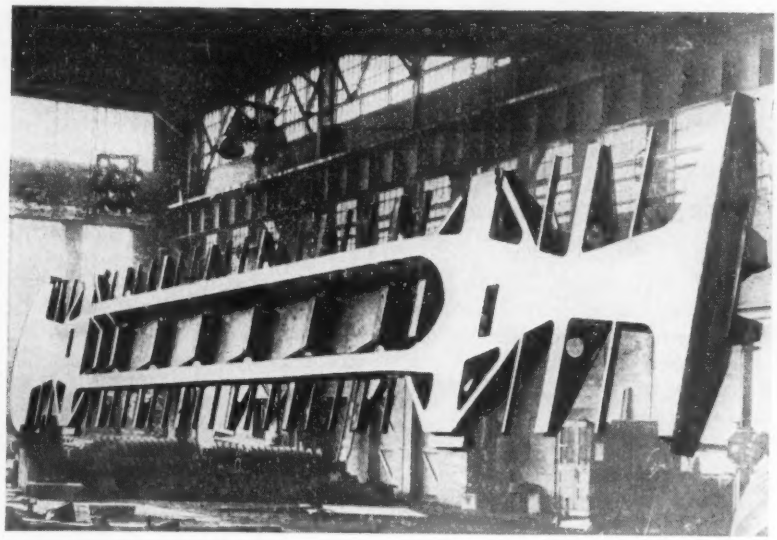
FLURRY of machine tool sales activity in January is generally reported by those builders whose prices were advanced late in the month or in early February. As is normally the case, the impending price rises drove in some sales which might not have been consummated for a month or more.

Those companies raising their tool prices place their level of sales for last month at about the same volume as in the final months of 1947, when ordering was above the year's monthly average. They admit, however, that these sales probably will detract from the February and March monthly sales totals.

Situation Varies — Builders who have not raised prices in the last several months paint a different picture of their January business. Budgetary appropriations by prospective tool buyers had not generally been acted upon by the close of that month, and as a consequence business was spotty and inquiries were off from the closing months of last year. This situation is expected to improve in the near future, however, and these companies expect a pickup in ordering which may put the year's final total very near the total 1947 volume of business.

For the most part, builders and distributors expect the largest part of their business this year to be for normal replacements rather than for major expansions. The peak of buying for new plants and additions appears to have passed and emphasis will be on cost reduction in existing facilities through improved manufacturing processes and machinery.

Deliveries Improve — In figuring new business, tool builders are now able to assure better deliveries than they could for many months. Supply of electric motors and other electrical components is no longer a pressing problem in standard machinery building, although for specialized applications extended deliveries still prevail. Gray iron castings also are reportedly in better supply with those companies enjoying good foundry connections. Malleable castings are not quite so easy to purchase. Currently, foundry operations and to some extent tool building are hampered by industrial gas shortages in important producing areas, but this temporary situation is not expected to affect shipments materially.



LOCOMOTIVE UNDERFRAME: Resembling the skeleton of a prehistoric monster, this is the welded steel underframe for a diesel-electric locomotive. Fabricated by Lukenweld, division of Lukens Steel Co., Coatesville, Pa., the structure was used by Baldwin Locomotive Works, Eddystone, Pa., to build a 2000-hp locomotive for the Gulf, Mobile & Ohio Railroad. Underframe is more than 78 ft long, nearly 9 ft wide, weighs 24,110 lb. The welded structure is made up of 346 separate steel plates

Request by JANMAT for More Equipment Pends

Industrial equipment set-aside program of the Joint Army-Navy Machine Tool Committee has been enlarged from the original 92,000 items listed last year to 182,000 items, including numerous classifications of production equipment such as machine tools, air compressors, arc welders and several kinds of materials handling equipment. The amplified request now is before the Bureau of the Budget which already has held one hearing on it but has not made a decision. The main consideration is the expense involved; unofficial estimates are that to put all this equipment in a military reserve "stockpile" would require at least $25 million to prepare for storage, ship and place in storage. JANMAT now has 16 teams from the three services which are screening all War Assets Administration lists of equipment so as to tag all items they desire.

WAA officials report a trend toward a "gray market" in certain machine tools like cylindrical grinding machines and turret lathes. Such tools at one time were a drug on the market and WAA looked forward pessimistically to the task of liquidation. Now dealers who bought them at WAA prices are selling them at much higher, in some cases at new tool prices. In one case a dealer who bought a 6-spindle turret lathe for $2105 has sold it for $3800.

WAA is intensifying its efforts to sell machine tools to schools and other training institutions. It is soliciting various state and municipal authorities, pointing out that the training of young men in use of modern machine tools is a sure way to encourage industrialization of lagging areas. Despite the fact that schools can purchase tools from WAA at 5 per cent of the regular WAA price, many communities have refused to become interested for one reason or another. For example, a move to install such equipment at Burlington, Vt., was held up by lack of training personnel in that section. Information in the hands of WAA indicates a great need for machine tools in some sections. WAA found in a recent survey, for example, that there are only about 280 machine tools in all of Oklahoma.

Although WAA has no exact inventory, it estimates the machine tools still remaining for disposition represent about $300 million in original cost to the government. This compares with disposition thus far of tools which originally cost approximately $1 billion.

In view of enlarged acquisitions by JANMAT and the intensified drive to dispose of more tools to schools and other institutions, WAA expects relatively few of those remaining to be sold as scrap.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Public relations status of steel industry improved over past year. Critics now less voluble as result of constructive policies adopted by steelmakers

NOTABLE development of the past year in Washington has been the very considerable improvement in the public relations status of the steel industry. A year ago—in fact, right along through the first half of 1947 and well into the fall—the steel industry was being accused of supporting an alleged policy of "promoting an economy of scarcity."

Sen. James E. Murray, Walter F. Reuther, AFL officials and others were accusing the leaders of the industry with paving the way for widespread unemployment by "stabilizing" steel capacity at 9 million tons. Left-wingers then were proposing that the government get behind an expansion to 110 million tons, with government loans or ownership to the extent necessary. There were hints that what eventually would be necessary was nationalization of the steel industry in some form—or at least such strong government controls as would insure industry policies that would promote the public good.

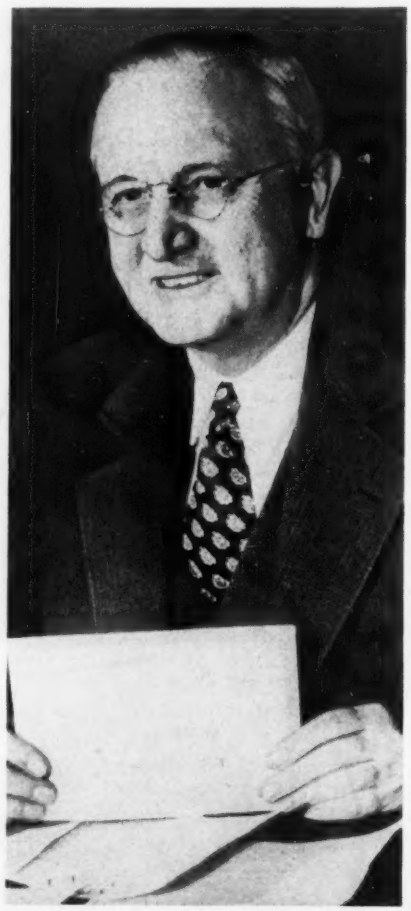
Little Such Talk Today—Today there is very little such talk. This is not to say that, given opportunity, the "reformers" will not be ready to resume their attacks. But this is not a very good time to try to whip up public sentiment against the industry. The reason is the effective policy pursued by the industry in recent months. In part, its frank publicity policy has had a beneficial effect; in particular, the continual stream of news releases about the size of the steelworks expansion program in progress, interspersed by the appearance of newspaper and other advertisements dramatizing the industry's expansion and other activities in the public interest have done a good job.

And the co-operative attitude of the industry has had a good effect. Congressional groups interested in obtaining increased nail production or a larger supply of pig iron for foundries have had assurances of hearty co-operation. Other congressional groups have had emphatic assurance that the steel industry is trying its best to stamp out the gray market in steel. The willingness of the steel industry to co-operate in the voluntary allocations program, first with the Office of Defense Transportation in providing more steel for freight cars, and of late with the Department of Commerce in reference to allocation requests now under study, have had their good effect.

Petroleum Industry Worried—Right now the petroleum industry is worried about its public relations status in Washington and fears that unless it firmly grasps leadership in the formulation of national petroleum policy the government will take over. The petroleum pinch in the last few weeks has given opportunities to government people eager to do something about oil.

Perhaps the thing that has most disturbed the oil men is Secretary Krug's demand for an intensified synthetic fuel program involving, among other things, 16 million tons of steel and $9 billion in money. Petroleum spokesmen told the House Armed Services Committee that while they were in favor of continued research work on synthetic liquid fuel along the present lines, they thought better and more immediate results would be obtained, dollar for dollar, by looking in the ground for new petroleum. They hope to bring in important new discoveries from present deep-well drilling, and from exploration of tidelands reserves, and they hope to locate important new reserves in Mexico.

Now in the discussion stage is a public relations drive for sympathetic popular understanding of the problems of the petroleum industry. First, the industry does not expect any need for gasoline rationing this coming summer. Second, until new domestic sources are developed and until the stream of crude imports is enlarged on a permanent basis, it does not favor any immediate major expansion in fuel oil consumption. Third, the petroleum industry is working out its problems and can be counted on to do a job in the public interest. These are the basic working concepts which will be utilized in a public relations drive by the oil industry in coming months.



HEADS FEDERAL RESERVE: Thomas B. McCabe, who succeeds Marriner S. Eccles as chairman of the Federal Reserve Board of Governors, is president of the Scott Paper Co.

Feeling Way on Tax Cut

Latest trend in thinking by Senate leaders on the subject of tax reduction is that there will be some reduction, but not nearly to the extent of the $6.3 billion cut approved by the House. Realizing that to act intelligently they will need a lot more information than they have now they have put off tax action until later on —till Mar. 15 or later. Possibly the action on taxes will lie over until the Senate has acted on the Marshall Plan; the latter is due for a vote in both houses by Mar. 31.

Feeling of the Senate leadership is that the maximum cut that can be made in the President's budget of $39.7 billion is $2.5 billion. On the basis of such a cut the Senate would see its way clear to cutting taxes by $4 billion as compared with the House tax cut of $6.3 billion. Whether the budget will be cut that much is a question, so that the President's characterization of the talk about a $2.5-billion budget cut as "just conversation" has had a discouraging effect. Certainly the ex-

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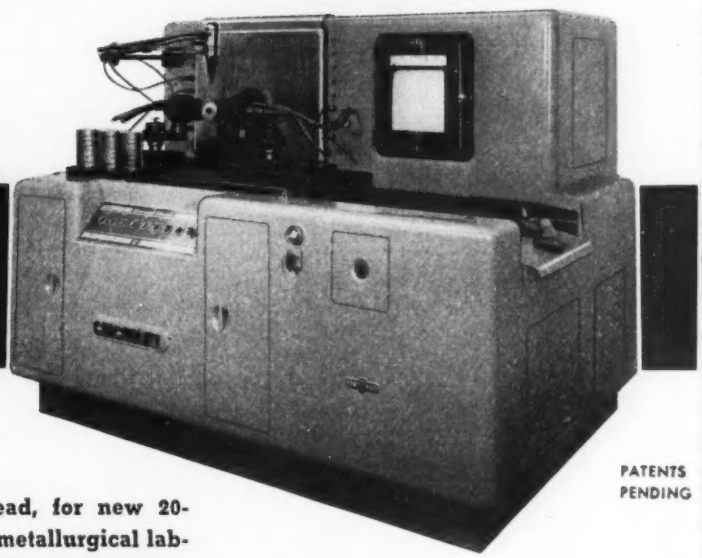

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CINCINNATI

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U.S.A.

perience in trying to cut federal expenses in the current fiscal year (see STEEL of Feb. 2, p.76) has been most disappointing.

Big Appropriations—In the first appropriations bill to reach the House, that for the first installment of the Independent Offices outlay, the reduction from the $1 billion budget request was only $56 million. The same day, Feb. 3, the House approved the Senate-passed bill to increase payments to veterans in college and in job training by $217 million.

In addition, about $250 million will be the cost in fiscal 1949 of the bill passed by both houses to liberalize the Civil Service retirement system. Neither of these items was in the President's budget, so that to effect a budget cut of $2.5 billion Congress, to make up for these two appropriations, must make a $3 billion cut.

That, however, is still only a starter as some more big appropriations are in the offing. For instance, there is a good likelihood the present budget request of $11 billion for the military establishment may be upped.

In general the outlook for cutting down on federal expenses is a gloomy one. For instance, the indications of an end to the reduction in federal employment, and a return to higher payroll costs (see STEEL of Dec. 22, p. 42), are more pronounced.

In his latest report, Senator Harry F. Byrd (Dem., Va.), chairman of the Joint Committee on Reduction of Nonessential Federal Expenditures, says: "Increase—not decrease—in federal personnel is to be expected in the remainder of the fiscal year on the basis of present prospects."

Despite loud claims of economies over the past year, the performance has been most disappointing and indications are that it will not be improved this election year. There are too many demands for federal handouts. The cost of government, as now charted, will continue high; the best opinion obtainable is that actual costs for fiscal 1949 will run considerably higher than the President's estimate of $39.7 billion.

All of which adds up to saying that the House made a grand gesture in approving a tax cut of $6.3 billion—but that the end result, after Congress has acted, will prove to be something much less.

Seaway Looks Like Dead Duck

On the basis of present indications, the St. Lawrence seaway and power project is a dead duck as far as the 80th Congress is concerned. Principal reason is that Senator Taft has lined up with Senators Ives and Lodge in opposing the project on the ground that "this is no time for large increases in the expenditures for public work." Enough western Republicans, as well as interested Democrats, will vote against the bill to insure its defeat when it comes up for action on Feb. 27.

DEFENDS OIL PURCHASES: Defense Secretary James Forrestal, right, appeared before the Senate War Investigating Committee to defend the Navy's action in purchasing Arabian oil at high prices in 1945. He said the Navy acted to insure adequate petroleum supplies while the country was at war. Forrestal is shown with committee chairman Sen. Owen Brewster. NEA photo

NLRB Adopts Panel System

The five-man National Labor Relations Board last week announced adoption of a panel system to decide cases, so as to expedite the process of decision. Under the new system, five rotating panels are created. Each panel will consist of three board members and will meet once a week. The full board of five will continue to meet at least twice a week to pass on cases involving important or novel policy questions.

The board's action was taken pursuant to authority of Section 3 (b) of the Labor Management Relations Act of 1947. This section provides: "The board is authorized to delegate to any group of three or more members any or all of the powers which it may itself exercise. * * *"

Chairman Paul M. Herzog made it known that the new system has been in operation since early January. During that month the board disposed of 134 cases, compared with 98 decisions in December. This represents an increase of 37 per cent in output by the board in Washington.

Of the 134 decisions issued by the board during January, 117 involved representation cases and 17 related to unfair labor practices.

At the end of January, 1948, 429 cases were pending decision by the board. This compares with a total of 533 pending on Aug. 22, 1947, the day when the Labor Management Relations Act took effect. During the period from Aug. 22, 1947, through January, 1948, the five-man board disposed of 450 cases.

FTC Bill Holds Interest

The Federal Trade Commission bill introduced last year by Rep. Joseph P. O'Hara (Rep., Minn.) and again this year is of considerable interest to industry because it would sharply restrict the powers of the commission. To put it briefly, the bill seeks to prevent the commission from acting in the roles of policeman, judge and jury. All judicial questions would be left to the courts. The bill has a long way to go before it can come to a vote. However, the House Interstate & Foreign Commerce Committee is expected to hold hearings on it this spring and will probably report it out in time for at least House action prior to summer adjournment.

Britain Boosts Steel Prices

Increases apply to export products with jumps ranging from $1 to $1.20 per ton. Unabated overseas demand will be partly met with shipments of about 1 million tons

BIRMINGHAM, ENGLAND

EXPORT PRICE increases on British steel have been made because of rising production costs due to higher freight rates and more expensive fuel. Heavy steel for export has been increased in price by $1 a ton, and the price of re-rolled steel has been boosted by $1.20 a ton.

These jumps are expected to have no effect on demand, with shipments overseas this year anticipated at about 1 million tons. Of this total, approximately 400,000 tons will go to northern European countries, including Russia, under agreements between the governments concerned. This severely limits the tonnage available for other markets. The increase in price is regarded as a modest one, which was possible largely because prices of iron and steel scrap remain at a relatively low level, compared with those prevailing in other parts of the world.

Domestic Shortages—Chief feature in the domestic steel trade is the shortage of billets, blooms and slabs. Reasons for this are the unprecedented world-wide demand and the fact that Britain's imports of these products from Belgium, France and Luxemburg have not been resumed on a prewar scale.

A storm of criticism has been aroused by the government's announcement of a cut in the allocation of steel for shipbuilding. The government has replied that there is insufficient steel to meet all needs despite the anticipation that 1948 steel production will exceed that of 1947. A new system of priorities will apply during the coming months, and instead of bulk priorities as in the past, specially authorized allotments for individual cases will be inaugurated. It is expected that producers for export will be the only beneficiaries of the modified policy.

Output Depends on Raw Materials—Steelmakers consider that attainment of the 1948 production goal rests entirely upon the supply of coking coal and iron and steel scrap. Heaviest demand for steel now comes from builders of power plant equipment, railroad freight cars and locomotives. The greatest increase in production during the coming year is contemplated in the agricultural equipment field in line with the government's plan to revitalize British farming. Automobile manufacturers have already reached output on a scale as heavy as that prevailing in 1938. As far as private vehicles are concerned, the bulk of these are going abroad, but the position regarding the supply of commercial vehicles for the home market is easier.

The northeast coastal area is producing more pig iron than any other section of Britain, but the 25 furnaces operating are wholly engaged in the smelting of iron for the steelworks. The shortage of foundry grades persists, and in the Midlands, which is the center of the light castings industry, foundrymen have great difficulty in getting sufficient raw material to keep in operation.

Czechoslovakia

Steel production in Czechoslovakia during 1947 was surprisingly good with 2,285,271 metric tons of ingots and castings turned out. This was 36.3 per cent above the 1946 total of 1,672,000 tons and was 3.9 per cent over the planned production for the year. Pig iron output during last year was 1,422,259 metric tons, against 961,000 tons in 1946, an increase of 48 per cent. The 1947 production was 6.1 per cent over the planned output for the year.

Exports of iron and steel from Czechoslovakia in November were 49,000 metric tons, mainly consisting of 11,000 tons of merchant bars, 9200 tons of tubes, 6800 tons of plates and sheets and 6000 tons of wire products. A trade agreement has been signed with Russia providing for delivery of Czech machinery over a period of five years. Czech steel tubes are included in the agreement. Czechoslovakia in return will receive foodstuffs, iron and other ores and ball bearings. Another trade agreement has been negotiated with the Netherlands by which Czechoslovakia will export machinery and semifinished steel.

Reconstruction of works in Czechoslovakia is proceeding well, and the output of the Skoda plants already exceeds the prewar rate.

India Plans Steel Expansion

JAMSHEDPUR, INDIA

PLANS for two new major steel producing units, each having an annual ingot capacity of 500,000 tons which would be capable of being doubled, have been revealed by Dr. Syama Prasad Mookerji, Indian Minister of Industry & Supply.

Total estimated capital would be $148 million. Matters regarding the operation, location and foreign technical assistance required, he added, were under active consideration. The expansion project is designed to help supply the growing demand for steel in India. Steel needs, he estimated, are as high as 2,500,000 tons per year, compared with a productive capacity of only 960,000 tons annually. This figure represents total output for 1947, and while production exceeded previous estimates by 60,000 tons, it was far short of demand, particularly since anticipated imports of 150,000 tons evaporated to a mere 20,000 tons actually received from overseas sources last year.

Import Outlook Bleak—Outlook for imports of steel during the coming year is not promising. Australia, Britain and America have been the principal sources, but U. S. authorities can give no assurances of increased supplies because of the needs of European Recovery Plan nations. India may obtain a small quantity of billets from Australia for which a long-standing order has been placed.

Production in government ordnance factories in the way of manufactured end products continues to improve. Tubing, pipe and components for road equipment are among the items made and the range of products is being steadily increased. Textile machinery is one of the most recent additions. Over 50 per cent of the component parts of steam rollers used in India were made at the ordnance plants last year. About 40 per cent of the parts for diesel rollers were similarly turned out.

Tin Plate Output Short—Production of tin plate was disappointing in India last year, with only 52,500 tons produced to meet annual requirements of 90,000 tons. Tinplate Co. of India operates the only plant producing this material in the country, at Tatanagar, and has an annual capacity of 75,000 tons. Plans are now in the embryonic stage to develop several localities where tin ores are known to be available. The Hazaribagh district is the most interesting, but ore quality is low. A Nonferrous Metals Panel has been organized to study the situation.

U. S. Foreign Trade at New High

Exports for 1947 valued at $14.5 billion, and imports reach $5.7 billion, all-time records. Steel exports in first eleven months of 1947 total 6,032,547 net tons

IN SPITE of tightened import controls effected by many countries, the volume of exports by the United States in 1947 reached a record high of $14,474.9 million. This total was 49 per cent higher than the 1946 value of $9,739.5 million.

Monthly and yearly figures, as compiled by the Bureau of the Census, Department of Commerce, reveal other records were established in foreign trade by the United States last year.

General imports were at an all-time high of $5,738.6 million, which was 17 per cent more than the $4,908.9 million imported in 1946. Imports during December of $600.5 million were the highest recorded for any month in history, and were 32 per cent greater than the November value of $454.9 million.

Approximately the same level of exports was maintained in December as in November, with the latest month's total being $1,130.7 million, compared with $1,138.2 million in the previous month.

OIT Analyzes Trade—A study of the high level of world trade in 1947, the official restrictions placed by many countries on imports not regarded as essential, the reasons for these curbs and the prospects for eventual moderation of these trade-restrictive trends has been made by the Office of International Trade of the Commerce Department.

The motive of most countries which have tightened up on imports, according to OIT, has been to readjust their general buying programs to their reduced ability to pay with the proceeds from current exports or other means at their disposal. With but few exceptions, the restrictions have been imposed by the countries' slow progress in economic recovery and financial stabilization. In a few countries, notably in Latin America, however, the desire to foster local production has appeared as a primary motive in their restrictions on foreign importations.

Durable Goods Admitted—Certain American-made products have been, and will continue to be, vital in the reconstruction and rehabilitation of many countries. Iron and steel products, of course, are among these commodities. Accounting for a large percentage of total domestic exports from the United States in December were such manufactures and materials. Machinery and vehicles, for example, ranked first in value among American exports with $361.3 million sent abroad in December. Vegetable food products and textile fibers and manufactures were second and third, respectively, in value during the month, followed closely by metals and manufactures except machinery and vehicles with valuation of $122.1 million. Nonmetallic minerals also were high in the export list with $118.4 million worth of domestic products shipped abroad in the latest month.

Iron, Steel Exports Totaled—The Commerce Department reports 6,032,547 net tons of semifinished and finished iron and steel products were shipped during the first 11 months of 1947. The accompanying table details these shipments and breaks them down into the three latest months.

Of the leading ferrous products exported during that period, plain and fabricated structural shapes were first with 702,233 tons. Tin plate and tagger's tin were second with 541,730 tons. Third largest shipments were of black steel sheets with 518,332 tons. Unfabricated plates other than boiler were in fourth place with a total of 498,983 net tons exported in 11 months. Close behind at 497,473 tons were steel bars, other than cold-finished and excluding alloy.

The Office of International Trade's export quotas of iron and steel products for the first quarter of this year are also listed in an accompanying table, which reveals that the leading products, by tonnage, allowable for export during that period are: Boiler and other plates, 111,600 short tons; iron and steel sheets, black, ungalvanized, 83,000 tons; welded casing and oil-line pipe, 68,335 tons; con-

U.S. EXPORTS OF IRON AND STEEL—11 MONTHS 1947

(Net Tons)

Semi-Finished and Finished Products:	September	October	November	First Eleven Months—1947
Ingots, blooms, billets, slabs, sheet bars	41,962	51,269	46,468	454,371
Wire rods	7,013	9,346	8,134	65,100
Skelp	7,488	6,332	5,117	64,065
Iron bars	2,410	1,648	656	34,302
Concrete reinforcement bars	24,982	18,168	18,565	230,736
Steel bars, cold finished	8,548	10,167	9,604	97,951
Other steel bars (excluding alloy)	42,337	41,927	40,767	497,473
Alloy steel bars	13,827	14,405	12,647	191,773
Welding rods, electric	1,285	1,480	1,196	13,120
Boiler plate	1,091	1,360	1,630	31,339
Other plates, not fab.	41,287	39,931	31,832	498,983
Plates, fab., punched or shaped	2,976	4,198	2,190	33,175
Iron sheets, black	1,997	2,784	2,378	28,642
Steel sheets, black	41,924	41,491	44,898	518,332
Galvanized sheets	5,932	5,198	4,425	69,431
Strip steel, cold rolled	7,694	7,532	6,663	81,978
Strip steel, hot rolled	8,203	8,854	8,860	98,452
Tin plate and tagger's tin	42,794	59,026	68,417	541,730
Terne plate (incl. long ternes)	834	1,245	1,062	11,328
Structural shapes, plain	60,400	71,808	44,128	702,233
Structural shapes, fab.			25,663	
Frames and sashes			340	
Sheet piling	2,883	4,112	3,445	35,048
Rails, 60 lbs. per yard and over	43,621	40,871	34,434	442,954
Rails, less than 60 lbs. per yard			1,456	
Rails, relaying			8,855	
Splice bars and tie plates			11,974	
Frogs and switches	16,149	14,797	494	145,155
Railroad spikes			1,377	
Railroad bolts, nuts, and washers			493	
Car wheels, tires and axles	5,435	9,906	5,151	83,862
Seamless black pipe	1,891	2,136	1,780	17,065
Seamless casing and oil line pipe	23,706	28,092	21,830	292,374
Seamless boiler tubes	5,784	6,525	5,603	61,997
Welded black pipe	5,776	5,388	6,100	85,898
Welded galvanized pipe	4,997	4,780	5,200	64,516
Welded casing and oil line pipe	*	*	11,454	*
Welded boiler tubes	*	*	252	*
Other pipe and fittings	10,292	9,963	8,340	92,850
Plain wire	7,287	6,986	9,344	76,364
Galvanized wire	8,892	10,372	7,938	90,924
Barbed wire	5,802	7,139	7,260	70,025
Woven wire fencing	658	984	1,162	11,341
Woven wire screen cloth	564	528	397	5,396
Wire rope and strand	1,341	2,334	1,237	29,736
Wire nails	2,181	3,008	2,448	24,036
Other wire and manufactures	4,060	5,464	5,261	47,525
Horseshoe nails	1,369	1,887	34	14,120
Tacks			288	
Other nails, incl. staples			1,011	
Bolts, nuts, rivets and washers, except railroad	4,392	5,295	4,676	43,651
Forgings	2,830	3,849	3,295	32,312
Horseshoes	116	20	5	884
TOTAL	525,010	572,605	558,234	6,032,547

* Included with seamless.
Source: United States Department of Commerce.

crete reinforcing bars, 47,000 tons; hot-rolled carbon steel bars, 1-in. and under, 40,000 tons; and seamless casing and oil-line pipe, 40,000 tons.

Urges Extension Of Decontrol Act

PROTECTION of our domestic economy and fulfillment of our international responsibilities require continuation of controls authorized by the Second Decontrol Act, Secretary of Commerce W. Averell Harriman states in his second quarterly report concerning administration of the act.

Controls on exports and rail transportation, due to expire Feb. 29, have already been extended for one year. The report recommends the following controls, also authorized under the act, be extended as well: Domestic distribution and use controls over tin, antimony and quinidine; import controls over fats and oils, rice and rice products, nitrogen fertilizer and pig tin; and the granting of priorities assistance where prompt export of a material is desirable in the national interest.

Controls Needed—Domestic distribution and use controls over tin, antimony and quinidine are still necessary because these materials are in critically short supply on a worldwide basis and because the United States is largely dependent upon imports for these crucial commodities, the report points out.

Total amount of primary and secondary tin available in the U. S. in 1948 will be about 91,000 tons. It is estimated that in the absence of restrictions on its use, commercial demands for tin would approximate 113,000 tons. Needs of the stockpiling program make the deficit still greater. "Removal of controls," comments Secretary Harriman, "would jeopardize the adequate supply now available for food preservation." Import control over pig tin is likewise necessary, the report adds, to fulfill U. S. commitments in the international allocation of this scarce commodity recommended by the inter-governmental Combined Tin Committee.

Export Controls Urged—Continuation of government's power to grant priorities assistance for export was also urged in the report. The report indicated how this priorities power boosted foreign tin production by enabling American machinery to be exported to the Netherlands East Indies.

Less than one-quarter by value of U. S. exports are under controls, Secretary Harriman points out in an analysis of the composition and geographical distribution of controlled exports. Coal, steel and petroleum represent almost three-fourths of the total of all controlled exports. A review of these commodities follows:

Coal—Total volume of coal exports from the U. S. in 1947—more than six times the prewar level—was possible without undue strain because of the high output here. Production of bituminous and anthracite coal during 1947 totaled approximately 673 million net tons, 50 per cent above 1939 output. Total output of coal and lignite in western Europe and Poland last year was about 496,000 tons, as compared with a corresponding prewar total of 617,000 tons.

Before the war our shipments of coal to Europe were negligible. In 1947, however, well over half our total exports of almost 80 million tons of coal and other solid fuels was shipped to Europe.

Steel Mill Products—Steel exports to all countries in 1947 totaled more than 6 million tons, compared with 2 million tons before the war. In the first nine months of last year, the sixteen countries participating in the Committee of European Economic Co-operation received about 30 per cent of all steel exported from the U. S., as compared with 16 per cent before the war. Other European countries received only 2 per cent compared with 6 per cent in 1938.

Petroleum—Before the war, this country exported about five times as much liquid petroleum and petroleum products as it imported. In 1947, however, the United States was a net importer. Exports of crude oil in 1947 to all destinations totaled 48 million barrels or 2.5 per cent of all supplies, compared with 72 million barrels or 5.6 per cent of supplies exported in 1939.

EXPORT QUOTAS—FIRST QUARTER 1948

(Short Tons)

Steel sheet bars, and tin-plate bars containing no alloy	750
Steel bars, cold finished, nonalloy, 1 inch and under	8,750
Concrete reinforcement bars	47,000
Other steel bars (hot rolled) containing no alloy, 1 inch and under, except tool steel and specialty steel	40,000
Wire rods, except specialty steel	10,000
Boiler plate	111,600
Other plates, except fabricated (hot and cold rolled included) containing no alloy	
Iron sheets, galvanized	*20,000
Steel sheets, galvanized	
Steel sheets, black, ungalvanized, (hot and cold rolled included), containing no alloy; with less than 0.40% carbon content	83,000
Iron sheets, black	
Iron and steel strip (cold rolled), containing no alloy, with less than 0.40% carbon content, except strapping	5,500
Iron and steel strip (hot rolled) containing no alloy, with less than 0.40% carbon content	7,650
Terneplate, including long ternes	1,000
Structural iron and steel, structural shapes:	
Except fabricated:	
Angles (except bulb angles), channels and beams, 6 inches and under	35,000
Casing and oil-line pipe:	
Seamless	40,000
Welded	68,335
Seamless black pipe, except casing, oil-line and boiler	4,000
Malleable iron screwed pipe fittings, 150-lb. pressure and under	4,800
Floor drains, cast iron; and the following iron and steel pipe fittings, when 150 lbs. pressure and under: Couplings; galvanized pipe fittings; malleable iron pipe fittings; pipe joints, grey iron, extension; pipe nipples, lap-welded, black; pipe plugs; pipe unions; screw elbows; swage nipples	
Cast-iron pressure pipe	12,000
Cast-iron pressure pipe fittings	
Welded black pipe, steel	†20,000
Welded black pipe, wrought iron	1,708
Welded galvanized pipe, wrought iron	
Welded galvanized pipe, steel	13,000
Iron and steel wire, uncoated	20,000
Wire nails	6,000
Nails: Asbestos shingle; cut; roofing, lead-headed; shingle; siding, zinc coated smooth, flat head, cement-coated	

* No more than 25% of the quota will be licensed for gages 22 and lighter.

† Licenses to be limited so that no more than 40% of the quota will be butt and lap-weld pipe.

Relax Provisions for Business Visits to Japan

American businessmen are now to be permitted to enter Japan and remain there for extended periods, Departments of State and Commerce have announced. The announcement supplements a recent release on the same subject by Supreme Commander for Allied Powers in Tokyo.

Since Aug. 15, 1947, American businessmen have been admitted to Japan for trade purposes. During this period original entry permits have been valid for visits of not more than 21 days, although those who have gone to Japan under these conditions have usually been able to secure permission to remain longer if necessary. Under the new regulations entry permits will be valid initially for 60 days, with provisions for extensions.

The new regulations are designed to permit American and other allied nationals who owned property in Japan prior to the war, to go to Japan or send representatives there in connection with interests in the country.

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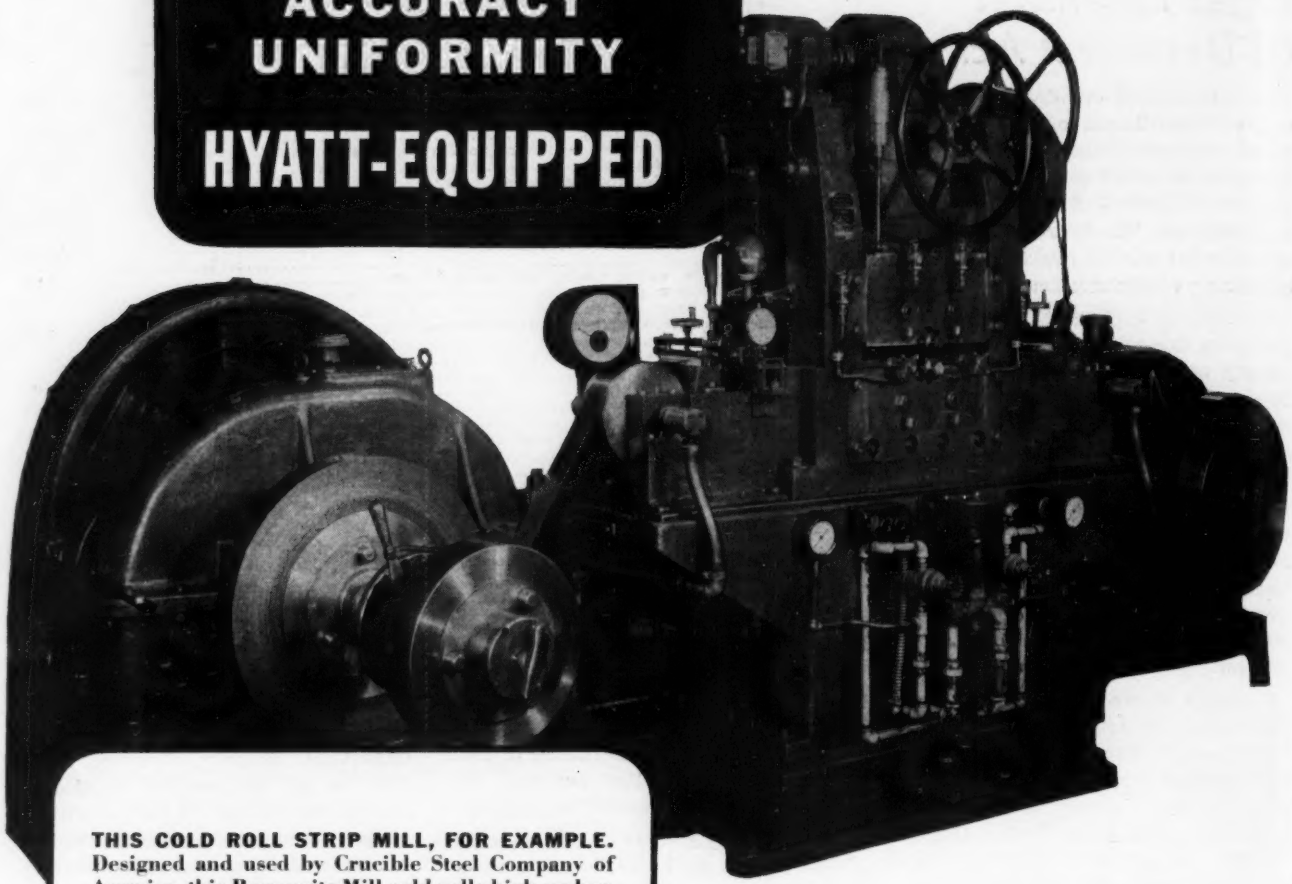

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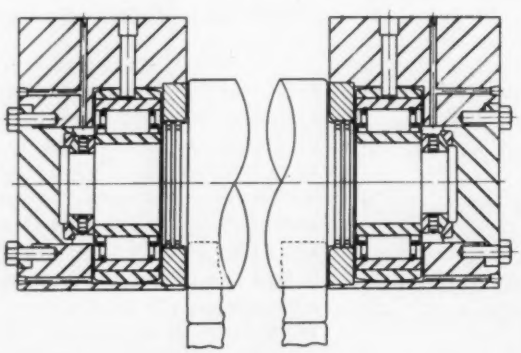

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HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Gas shortage causes production loss of 30,000 automobiles and trucks weekly, while 150,000 employees lose wages . . . K-F and union co-operate on time standards

DETROIT

"OUT of gas" continued to be the Detroit story last week, and despite desperate gnashing of teeth and prolonged protests the pipes leading to heat treating furnaces and paint drying ovens held nothing but hot air. Meanwhile the auto industry is losing 30,000 cars and trucks a week and 150,000 employees are losing their weekly wages. Hundreds of parts suppliers are affected as well.

Co-operate on Time Standards

A plan for more direct union participation in working out the problem of what is a fair day's work has been adopted at Kaiser-Frazer's Detroit Engine plant. The company and the union local have agreed on a procedure whereby time standards grievances are processed through time study stewards who have been especially trained for the job. The agreement was reached a few weeks ago. The stewards have been trained in Chicago and the plan is now in operation.

Kaiser-Frazer has operated its engine plant in Detroit since Mar. 3, 1947, on lease from Continental Motors Corp. Some 3400 persons are employed at the Detroit plant. Production of engines has increased from 200 a day last March to approximately 800 a day in recent weeks.

Until recently, time standards grievances were handled through the normal grievances procedure, beginning with negotiations between departmental union stewards, foremen and labor relations representatives. The company made several proposals to the union for a change in the procedure in order to bring professional training to bear on the problem.

The union accepted a proposal for the training of time study stewards. It was agreed that candidates for the jobs should be selected on an objective basis. Eighty-four union members applied and were given aptitude tests supervised by the Detroit Board of Education.

The nine union members who received the highest grades in those tests were sent to Chicago for two weeks in January for special training in time study in the laboratory of George Fry and Associates, engineering consultants. Eight company time study men took the same training course.

The company continues to establish standards. The union time study stewards enter the picture only when there is a dispute. This is not a wholly new idea in labor relations. On the other hand, it is not the general practice in the automobile industry, and it is, therefore, being watched with interest in Detroit.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1947	1946
January	366,205	109,890†
February	393,636	101,656†
March	443,588	134,072†
April	445,137	229,888†
May	404,191	263,445
June	421,466	217,943
July	400,944	315,966†
August	364,478	358,446†
September	444,501	339,774
October	461,536	406,572†
November	417,493†	389,645
December	488,114*	393,239†
12 mos.	5,051,289	3,260,536†

* Preliminary.
† Revised by Auto. Mfrs. Assn.

Estimates for week ended:

	1948	1947
Jan. 24	110,774	93,278
Jan. 31	101,044	94,114
Feb. 7	82,802	89,958
Feb. 14	80,000	97,276

Estimates by Ward's Automotive Reports

Opens Western Assembly Plant

Chevrolet will officially open its second postwar assembly plant at Los Angeles this month. Like the Flint, Mich., plant, which was added to the company's operations last June, the Los Angeles facility features "suspended assembly" of automobiles among other novel industrial installations.

New on the coast and also the most elaborate application of its kind anywhere are so-called Brazilian sunshades designed to keep interior temperature in check on hot summer days.

At one-shift capacity, the Los Angeles plant will build 35 passenger cars and 15 trucks an hour, boosting Chevrolet's national daily output above the 5000-vehicle mark.

The Los Angeles plant contains three main two-story buildings of steel and concrete. The principal structure runs 610 x 800 feet, approximately one-third of which will be occupied by the production of Fisher passenger car bodies for Chevrolet.

The "suspended assembly" principle, first introduced at the new Flint plant and hailed as a revolutionary advance in auto production materially reduces the physical effort of assembly. In the innovation the frame is hung on an overhead conveyor and travels through the assembly sequence at a height most convenient to workers. Assemblers no longer have to stretch or bend for their duties.

Brazilian sunshades on the east and west sides of the buildings consist of a series of vertical slats or fins extending outward from the windows. These fins are mounted at an angle so as to admit a normal amount of light yet at the same time exclude the hot, direct rays of the sun. Interior temperatures are reported reduced as much as 15 degrees on uncomfortably warm days.

The Los Angeles plant is the eleventh Chevrolet assembly unit. Parts are supplied by 12 manufacing plants which are also located in different sections of the country.

1948 Cadillac Restyled

The 1948 Cadillac has the new General Motors body styling with length and sleekness emphasized in the side-approach. Front fenders blend smoothly into the extended sides of the body continuing to the rear fenders in an unbroken line. Rear ends of the rear fenders are raised to form vertical fins suggestive of aircraft design and embodying new tail and directional lamps fitted into the trailing edges of the rear fenders. The rear deck is longer and lower, giving a "compelling illusion of suave surge."

Frontal approach emphasizes the car's road-hugging lowness and massive width. The radiator grille is lower and wider, consisting only of two horizontal chrome bars, divided by seven vertical fins of stainless

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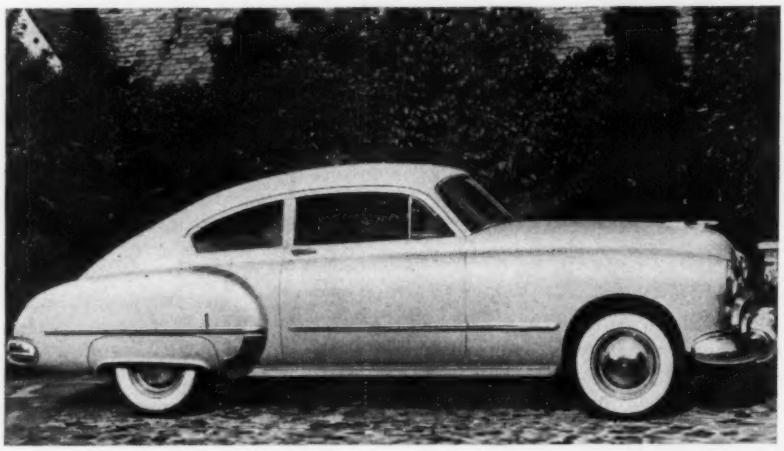


FUTURAMIC OLDS: Long, low and streamlined, the 1948 Oldsmobile offers General Motors version of postwar styling. Shown is the series 98 club sedan

steel. Headlamps are recessed in the upper portion of the front fenders. Combination parking and directional lamps also are recessed in the fenders below the headlamps.

Front bumpers are heavier for added protection and are used to highlight the basic approach pattern and follow fender contours closely. The new hood slopes forward, offering greater road visibility. Hood side panels are integrated with the top panel and blend into the fenders. Greater arc of vision and smoother exterior contours are derived from the curved windshield glass and narrowed front pillars.

Interiors have been enhanced and include a completely enclosed instrument panel, increased window area, new upholstery fabrics and leather, wider seats, more leg room and innovations in the use of chrome and leather trim.

All of the driving instruments are grouped in a compact cluster, above the steering column and just ahead of the steering wheel, at the optical distance recommended for best reading. The lower edge of the panel has been carried downward and forward to the front edge of the toe-board.

A new steering column jacket completely conceals the steering and gear-shift columns behind the instrument panel extension.

Unveil Light Tractor

New lightweight tractor, hailed as the agricultural equivalent of the Model T, was unveiled recently by the Frazer Farm Equipment Corp. at the Waldorf-Astoria in New York.

The tractor utilizes an air-cooled, aircraft-type engine of 6 horsepower, said to be the smallest ever to power a tractor in this country. An offspring of the Swiss Simar engine, it is reported to run for from one to three hours on a gallon of gasoline and can be switched to kerosene after it is warmed up.

Total weight of the tractor is 1020 pounds.

It is designed especially for use with a rotary tiller.

K-F Stock Deal Dropped

The $10 million Kaiser-Frazer stock deal, under which 900,000 shares of the automobile company's stock were to have been sold at $13 a share, was dropped suddenly last week and financial circles were at loss for an immediate explanation for the action.

Proceeds of the sale were to have been used to step up production to 1500 units daily. Output recently has approached 1100 units daily.

Urges Road Program

The United States should have a continuing, permanent road-building program financed by annual state and federal grants, according to Dwight W. Winkelman, vice president of the Associated General Contractors of America, in recent testimony before the Subcommittee on Roads, House Public Works Committee.

Declaring that stop-and-go road programs impair contractors' efficiency, raise costs and cause faster deterioration of existing road systems, Mr. Winkelman testified that the nation's road contractors are now at their optimum efficiency with new equipment in adequate supply for the first time since before the war.

In regard to costs, Mr. Winkelman indicated that New York will have to spend $143 million a year until 1960 if its highways are to be brought up to date. The federal-aid share of the New York program, on the basis of the $500 million a year national program, would be about $33 million. The task has just begun and is of monumental size, he added.

Highway construction costs are in line, he continued. Cost per mile has risen only 31.5 per cent in the past two years. The general wholesale price index compiled by the Bureau of Labor Statistics has climbed 54.3 per cent in the same period.

Cross Licensing Continued

The automotive industry's patent cross licensing plan has been continued by the adoption of new agreements, the twelfth extension of the plan now in its thirty-fourth year of operation. A total of 17 motor vehicle manufacturers have adopted the agreement which with certain exceptions covers patents owned on Jan. 1, 1940. These companies account for 95 per cent of the vehicle production achieved by members of the Automobile Manufacturers Association. All participating firms are able to obtain the use of each other's patented inventions included in the plan without fear of infringement.

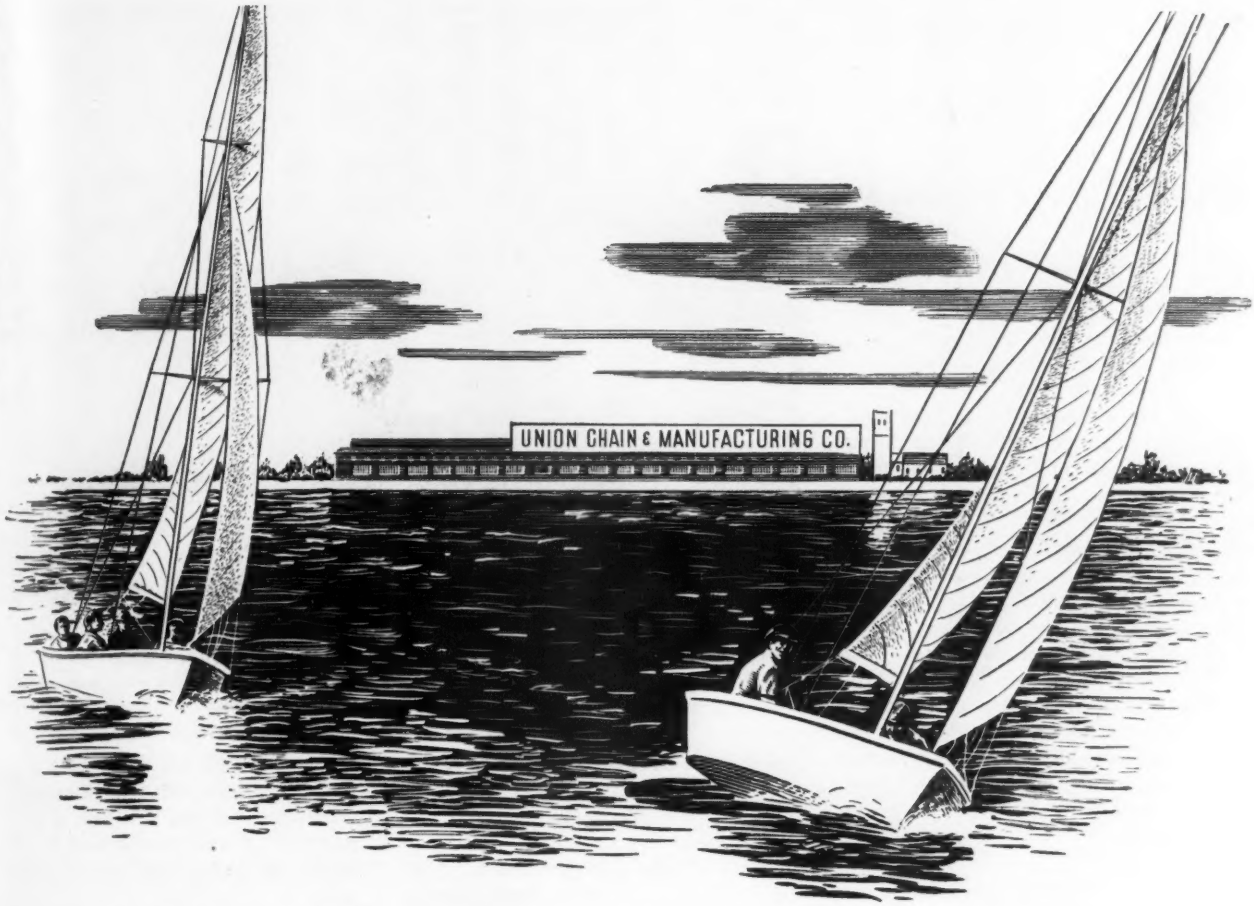
Nonferrous Foundries' Volume Under Capacity

Survey of business conditions in the foundry industry taken at the board of directors meeting of the Non-Ferrous Founders' Society held in Cleveland Feb. 8 and 9 indicates volume is around 40 per cent under capacity.

Negotiations with labor in some sections of the U. S. will affect prices but the industry has pledged itself to hold down inflationary trends. The society is having a series of advisory bulletins prepared for its membership regarding rights of management under the Taft-Hartley Act.

Further decreases in nonferrous metal prices may allow increased substitution of nonferrous castings where shortages of iron and steel exist.

Cost clinics to be conducted throughout the country sponsored by the Non-Ferrous Founders' Society chapters will help solve the foundrymen's problem of decreased volume caused by higher metal and labor costs. The first clinic will be conducted in the Cleveland area beginning the latter part of February. All nonferrous foundrymen are eligible to attend this course of six to eight lectures.



What's Interesting About UNION CHAIN'S Personnel?

Union Chains for Every Application

Drive and Conveying Chains and Sprockets
- Bridge Chain
- Combination Malleable Iron and Steel Chain
- HB (hardened bearing) type chain
- BP (bar and pin) type chain

★

Finished Steel Roller Chains and Sprockets
- All manufacturer's standard, size ⅜ in. to 2½ in. pitch
- Single and Multiple Strands
- Extended Pitch Series in sizes 1¼ in. to 4 in. pitch

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Silent Chain and Sprockets
- All sizes ⅜ in. to 1½ in. pitch

★

Flexible Couplings
- Roller chain type
- Silent chain type

That most of them, living as they do on the shores of Lake Erie, are expert sailors? No, not that exactly. The interesting thing about UNION CHAIN people is that everyone from punch press operator to chief engineer, from draftsman to inspector, from president to office boy, concentrates every minute of his working day or night on one thing: chain. We believe such specialization is interesting—and important—to you who buy sprocket chain and attachments for transmitting power or handling materials.

The Union Chain and Manufacturing Company

TRANSMIT POWER
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Sandusky, Ohio, U.S.A.

New Regime at Jack & Heintz Boosts Output

MUCH of the highly publicized wartime personnel program of Jack & Heintz Inc., Bedford, O., has been retained practically intact at today's Jack & Heintz Precision Industries Inc., Cleveland.

The new organization, a 1946 consolidation of Precision Products Corp., Eisemann Corp. and the original Jack & Heintz Inc., still provides free hot lunches, complimentary coffee during rest periods, complete medical facilities gratis, profit-sharing plan, completely company-paid insurance, medical-bill-payment program and a public address system with music and announcements.

The company believes that these benefits create a spirit of mutual trust and confidence between labor and management and their record of increased production, low absenteeism and low turnover rate attests to this fact as not a single manhour due to strikes or work stoppage has been lost.

Expands Output — Utilization of mass production techniques together with the consolidation of allied processes in one central plant area enabled Jack & Heintz Precision Industries Inc. to greatly expand its production during 1947. Output exceeded that for the entire operational year 1946 by 768 per cent in the electric motor division, by 433 per cent in the ball bearing division, and by 157 per cent in the magneto division.

Refrigeration equipment output was increased 240 per cent in just 4 months, a rate of rise unparalleled in refrigeration history.

Aviation division production, though its specialized-shop nature renders accurate percentage representation difficult, also expanded appreciably during the past year.

Two major transfer operations spearheaded a general layout "streamlining" program which provided each of the company's five production divisions with a modern section containing all manufacturing processes related to that division. The program necessitated the relocation, both intraplant and interplant, and compassing a 20-mile area of greater Cleveland, of machinery and equipment for entire divisions.

Facilities Modernized — Assembly lines were conveyorized wherever possible, color-dynamic principles were used in repainting equipment and humidity control facilities were installed wherever necessary.

Each of the five production divisions—fractional horsepower electric motors, aviation equipment, ball bearings, magnetos, and refrigeration condensing units—has been placed under the direction of a recognized manufacturing specialist within that field.

View through communication center record room where seven different record programs may be distributed simultaneously to any section of the three Jack & Heintz Precision Industries plants. Live broadcast is being produced in far radio studio

American-Standard Begins $12 Million Expansion

American Radiator & Standard Sanitary Corp., Pittsburgh, maker of heating equipment and plumbing fixtures, has started a $12 million expansion program aimed to increase production of plumbing fixtures 20 per cent and of many heating equipment items even more, D. D. Couch, vice president and general manager of sales, reported at a regional company sales meeting held last week in Washington. By the end of the year the firm expects to have a new pottery, a new brass plant and additions and improvements to present operations, he added.

Ohio Valley Steel Enters Prefabricated Industry

Ohio Valley Steel Sales Co., Steubenville, O., has begun a $300,000 expansion program and has entered the prefabricated building industry. A. O. Green, president, has announced.

The fabricating, warehousing and steel sales firm has purchased a plant and a 15-acre tract at Irondale, O., near Steubenville, and full-scale production of the prefabricated structures is scheduled to be started Mar. 1.

LeBlond Opens Detroit Sales and Service Office

A district sales and service office for Michigan has been opened in the New Center Bldg., Detroit, by R. K. LeBlond Machine Tool Co., Cincinnati, maker of lathes, according to B. N. Brookman, vice president and sales manager.

Oscar P. Noe, associated with LeBlond for over 30 years, will be in charge of the new office. Assisting him will be Joseph Gebel and Clason Shumard.

Consolidate Paisley Firms Under Chicago Office

Paisley Products Inc. of Illinois and Paisley Products Inc. of New York, manufacturers of industrial adhesives, have been consolidated with headquarters at 1770 Canalport Ave., Chicago, according to an announcement by Joseph Morningstar, president of Morningstar, Nicol Inc., New York, the parent firm.

Murray Stempel, formerly general manager of the Illinois company, has been elected vice president and general manager of the consolidated operations.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

General Electric Co., Schenectady, N. Y., announces it will terminate all appliance allocations before the end of this year if its current production rate is maintained.

—o—

Department of Commerce has published a 70-page report, "The Geographic Distribution of Construction in the United States, 1939-1947," as a supplement to its January report on construction and construction materials.

—o—

New York Central System, New York, reports that 460 new industries which located along its right-of-away in 11 states during 1947 originated approximately 221,670 carloads of new freight traffic during the year.

—o—

Union Mfg. Co., New Britain, Conn., maker of chucks, chain hoists and gray iron castings, has acquired the air chuck and air chuck cylinder business of Hannifin Corp., Chicago.

—o—

John Ramming Machine Co., St. Louis, manufacturer of precision machinery and machine parts, has purchased Bignall & Keeler Machine Works, Edwardsville, Ill., maker of pipe threading and cutting machines, from the owner, N. O. Nelson Co., St. Louis. The Nelson firm is withdrawing from manufacturing activities to devote its facilities entirely to jobbing and wholesaling plumbing and heating equipment and supplies. Operations at Bignall & Keeler will be moved to St. Louis.

—o—

Pressed Steel Car Co., Pittsburgh, delivered 11,511 freight cars to railroads in 1947.

—o—

Bureau of Labor Statistics reports that more than 2 million workers were disabled by work injuries during 1947. This was slightly higher than the figure for 1946. Fatalities from industrial accidents numbered 17,000 last year as compared with 16,500 in 1946.

—o—

General Fabricators Inc., Cleveland, manufacturer of fluorescent lighting fixtures, has moved to a plant at 3470 Theuer Ct. which doubles the firm's floor area.

—o—

Lockheed Aircraft Corp., Burbank, Calif., reports its 1947 deliveries totaled $133 million, $73 million of which were to the armed forces and $60 million to commercial airlines. Firm's backlog at the end of 1947 was $126 million, compared with $156 million a year earlier.

—o—

Hunter Pressed Steel Co., Lansdale, Pa., maker of springs, metal stampings and other components, is inaugurating Apr. 6 a series of free training courses for the inspection personnel of component-buying industries.

—o—

United States Rubber Co., New York, has developed a radiant heating panel which generates heat from electricity. The panels, adaptable for home heating, make use of a conductive rubber resistance element.

—o—

Gladden Products Corp., Glendale, Calif., manufacturer of motorcycles, has named Johnson Motors Inc., Pasadena, Calif., as the national dealer for its products.

—o—

Allen-Bradley Co., Milwaukee, maker of motor controls and other electrical devices, has appointed R. A. Lundbeck Co., Minneapolis, as its distributor in Minnesota, North Dakota, South Dakota and western Wisconsin.

—o—

Joseph T. Ryerson & Son Inc., Chicago, has published a booklet describing the facilities of its modernized Pittsburgh plant.

—o—

Lukens Steel Co., Coatesville, Pa., reports that at the close of business on Jan. 15 it had 327,976 shares of common stock outstanding, of which 317,976 can be voted by 1609 stockholders.

—o—

Playboy Motor Car Corp., Buffalo, has moved to 2450 Kenmore Ave., Buffalo.

—o—

Buckeye Tools Corp., Dayton, O., manufacturer of pneumatic and electric tools, has opened a new test room at its Dayton plant.

—o—

National Bureau of Standards has submitted a recommended commercial standard for hot-rolled rail steel bars to producers, distributors and users.

—o—

Borg-Warner Corp., Chicago, announces formation of an Industrial & Utility Section of its Borg-Warner International Corp. New division, with headquarters at 321 W. Lafayette Ave., Detroit, will be headed by Claude Pitts. Section will handle the export activities of many makers of industrial and utility products.

—o—

Wilson Welder & Metals Co. Inc., New York, manufacturer of welding machines and electrodes, has appointed Industrial Air Products Co., Portland, Oreg., as its electrode distributor in Oregon.

—o—

Cribben & Sexton Co., Chicago, has begun production of its 1948 model Universal Gas Range.

—o—

Aurora Metal Co., Aurora, Ill., producer of die castings, has named Morgan Sales & Engineering Co., Chicago, as its representative in Illinois and northern Indiana.

—o—

New York University, New York, announces that its College of Engineering will offer a course on the heat pump during the second term of the 1947-48 year.

—o—

Hagan Corp., Pittsburgh, combustion and chemical engineering firm, has opened a branch office at 2018 Blake St., Denver, with W. C. Bennett as district manager.

—o—

Brown Instrument Co., Philadelphia, industrial instrument division of Minneapolis-Honeywell Regulator Co., has opened a district office at 922 Dermon Bldg., Memphis, Tenn.

—o—

Dampney Co. of America, Boston, manufacturer of protective coatings for metal surfaces, has appointed Paxton Co., Norfolk, Va., as its distributor in Virginia.

—o—

American Management Association, New York, has published a review of current policies, practices and problems in business and industrial management. Copies may be purchased from the association's headquarters at 330 W. 42 St., New York, for $1.

—o—

Budd Co., Philadelphia, manufacturer of automotive, railway and agricultural equipment, reports that in 1947 30,274 car loads of equipment were shipped from its Hunting Park plant in Philadelphia.

—o—

Bureau of Mines has released a report on concentration tests of Montana corundum ore which yielded some high grade concentrates suitable for industrial use.

—o—

Fafnir Bearing Co., New Britain, Conn., maker of bearings, has opened a warehouse and sales office at 801-811 E. 20th St., Indianapolis.

The Business Trend

OUTPUT of the nation's factories has been further curtailed by continuing cold weather. Restrictions on industrial gas consumption are primarily responsible for the production drop, but movement of raw materials and finished products also has been hampered, with all forms of transportation affected. STEEL's industrial production index for the week ended Feb. 7 reflected these conditions by falling six points to 157 per cent (preliminary) of the 1936-1939 weekly average. To date this year, however, most basic indicators of industrial activity have remained above the level of last year, with the index showing a 1948 weekly production advantage over last year of from 4 to 20 points.

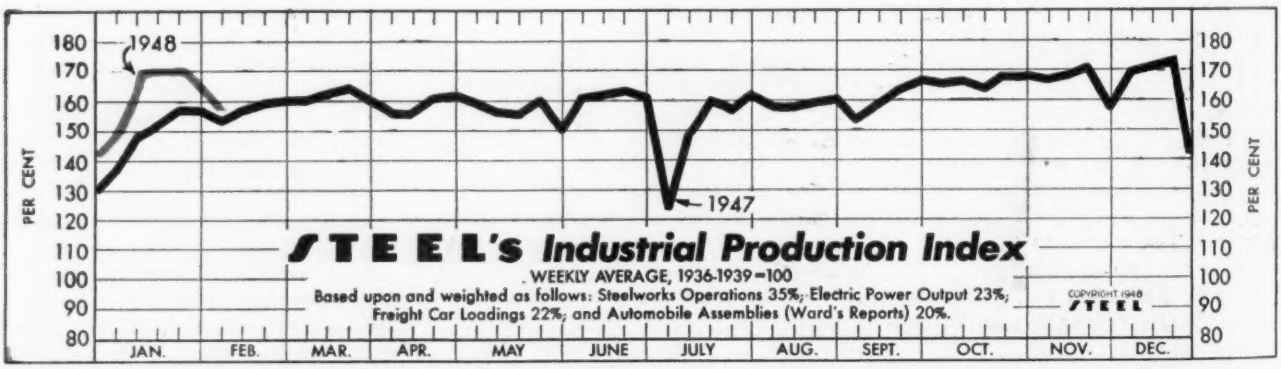
STEEL—Further drop in the national ingot rate to 94 per cent of capacity for the week ended Feb. 7 points up the present inadequacy of steelmakers' raw materials supply. Increasing tightness in certain finished steel products, in addition to flat-rolled carbon items, has been noted recently.

AUTOS—United States and Canadian production of cars and trucks dropped sharply again in the week ended Feb. 7 due to lack of industrial gas, and, according to *Ward's Automotive Reports*, only 82,802 units were built, compared with 101,044 in the previous week, 89,958 in the corresponding week a year ago and 127,675 in the same week of 1941. The industry's employment is at a record level and is still rising, U. S. Employment Service announces. During December, the service says, the number of wage and salary workers in the industry topped one million for the first time and approximately 20,000 more are expected to be added by Apr. 30.

ELECTRICITY—Contrary to normal post-holiday experience, consumption of electricity which set an all-time record in the week ended Jan. 24 at 5436 million kilowatt-hours continues to stay near this high level. Two factors are reportedly responsible: Cold weather which has called into use for home heating every conceivable electrical appliance with a heating element, including even toasters; and drought conditions in southern California, where irrigation with electric-powered pumps has become necessary about three months earlier than usual.

ENTERPRISE—Incorporation of 112,638 stock companies during 1947 has been reported by Dun & Bradstreet Inc. This total was 15.3 per cent less than had been chartered in the record 1946 year. Of the 1947 total, 47 per cent of the new companies are in New York, California, Illinois, New Jersey and Ohio. The largest number of business failures since 1942 was tallied in 1947. The total of 3476 companies was three times greater than failures in 1946. In comparison with immediate prewar years, however, foldings were only about one-fourth as numerous.

PRICES—Lower agricultural prices in the week ended Jan. 31 were mainly responsible for the 0.4 per cent decline in average wholesale prices reported by the Bureau of Labor Statistics. Its composite index registered 163.7 per cent of the 1926 average.



The Index (chart above): Week Ended Feb. 7 (preliminary) 157 Previous Week 163 Month Ago 168 Year Ago 153

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	94.0	95.5	97.0	92.0
Electric Power Distributed (million kilowatt hours)	5,412	5,429	5,278	4,801
Bituminous Coal Production (daily av.—1000 tons)	1,890	2,033	1,924	2,293
Petroleum Production (daily av.—1000 bbl.)	5,332	5,318	5,313	4,770
Construction Volume (ENR—Unit $1,000,000)	$123.8	$99.7	$85.7	$111.5
Automobile and Truck Output (Ward's—number units)	82,802	101,044	111,276	89,958

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

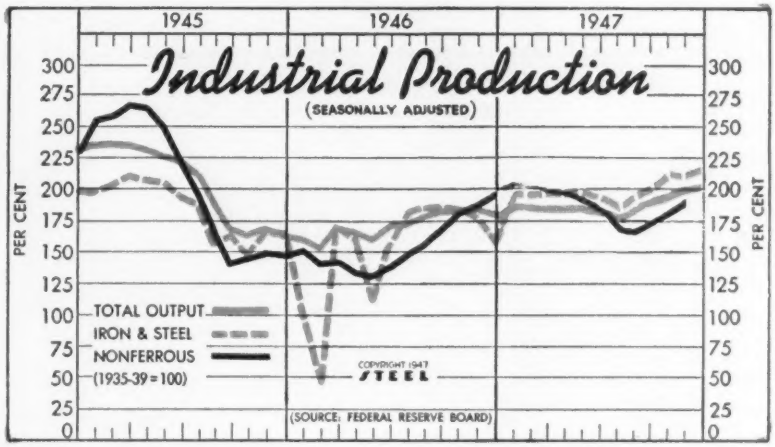
TRADE				
Freight Carloadings (unit—1000 cars)	715†	727	831	767
Business Failures (Dun & Bradstreet, number)	97	91	87	45
Money in Circulation (in millions of dollars)‡	$28,124	$28,086	$28,658	$28,295
Department Store Sales (change from like wk. a yr. ago)	+7%	+3%	+9%	+10%

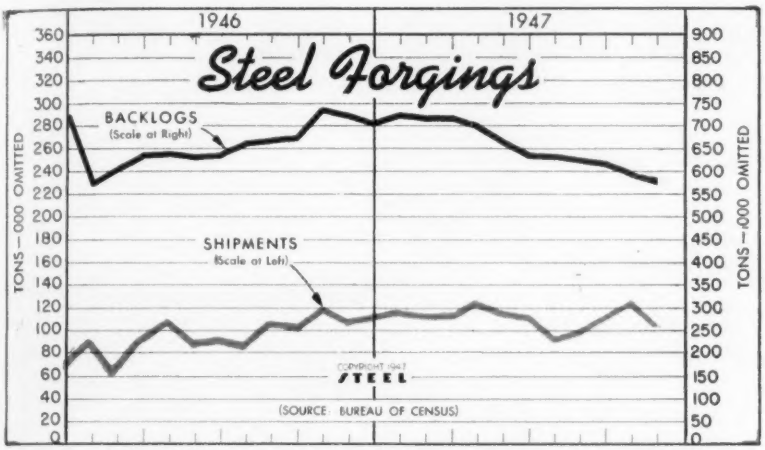
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	189	160	192	102	204	150
Feb.	189	152	191	43	205	141
Mar.	190	168	196	169	199	139
Apr.	186	165	195	159	197	132
May	185	159	197	109	187	128
June	184	170	193	154	179	137
July	177	172	181	180	172	151
Aug.	182	178	188	184	171	159
Sept.	186	180	195	185	174	172
Oct.	190	182	204	184	179	184
Nov.	192	183	202	178	184	192
Dec.	191	182	206	159	...	197
Ave.	187	170	195	150	...	157





Steel Forgings

Tons—000 omitted

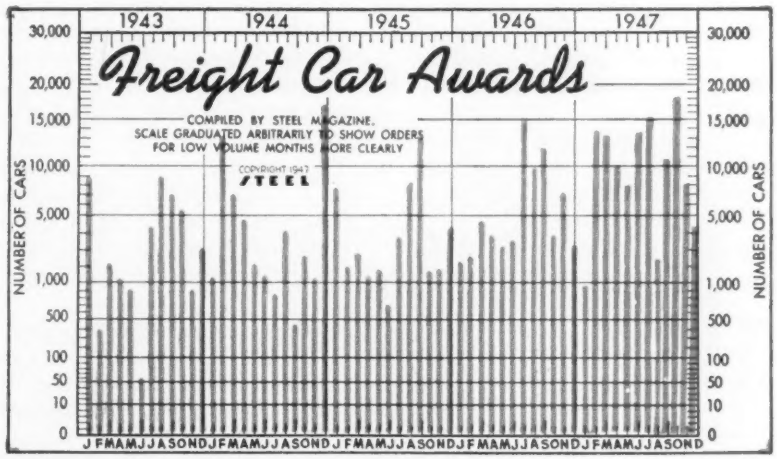
	Shipments*		Unfilled Orders*	
	1947	1946	1947	1946
January	116	92	723	570
February	111	63	714	606
March	115	87	717	637
April	121	106	699	639
May	115	89	663	631
June	110	93	638	635
July	92	86	631	661
August	98	108	626	666
September	109	102	617	671
October	124	119	594	736
November	104	108	586	727
December	...	110	...	707

* Forgings for sale.

Freight Car Awards

	*1947	*1946	1945	1944	1943
Jan.	9,172	1,481	7,200	1,020	8,365
Feb.	13,727	2,328	1,750	13,240	350
Mar.	12,049	3,512	2,500	6,510	1,935
Apr.	9,296	3,564	1,120	4,519	1,000
May	7,389	2,900	1,526	1,952	870
June	12,784	3,335	670	1,150	50
July	14,840	14,836	3,500	795	4,190
Aug.	2,372	9,527	7,240	3,900	8,747
Sept.	9,917	11,102	12,840	400	6,820
Oct.	17,737	3,407	1,320	2,425	5,258
Nov.	8,169	6,690	1,650	1,065	870
Dec.	4,218	3,441	4,116	16,245	2,919
Total ....†	121,707	66,723	45,432	53,221	41,374

* American Railway Car Institute.
† Preliminary.


1943
1944
1945
1946
1947
Freight Car Awards
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1947 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,265	$13,929	$12,950	$13,276
Federal Gross Debt (billions)	$254.8	$256.6	$256.5	$259.1
Bond Volume, NYSE (millions)	$20.8	$22.8	$28.4	$27.9
Stocks Sales, NYSE (thousands)	5,126	4,575	5,178	7,908
Loans and Investments (billions)†	$65.0	$65.5	$64.8	$55.8
United States Gov't. Obligations Held (millions)†	$37,323	$37,886	$37,227	$35,636

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$78.59	$78.59	$78.05	$69.36
All Commodities†	163.7	164.4	164.4	140.3
Industrial Raw Materials†	182.3	184.8	184.5	152.6
Manufactured Products†	156.5	156.5	156.6	135.6

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

FREDERICK W. RYS

E. P. CUNNINGHAM

ROBERT URQUHART

Frederick W. Rys has been named assistant works manager of the Firth Sterling & Carbide Corp., Pittsburgh. Associated with the company since 1940, Mr. Rys has served for the past two years as superintendent of melting.

—o—

James M. White, vice president in charge of manufacturing, Allis-Chalmers Mfg. Co., Milwaukee, has resigned his position, but will remain in an advisory capacity for the next six months. Manufacturing operations will continue under the direction of **Fred S. Mackey,** general works manager in charge of all general machinery plants, and **Hugo W. Liebert,** general works manager in charge of all tractor plants.

—o—

Edgar H. Krainer has been appointed chief engineer of the U. S. Broach Co., Detroit, succeeding **R. L. Kamischke,** recently appointed the company's New York state representative.

—o—

Rodney Chase has been elected vice president in charge of public and industrial relations for Chase Brass & Copper Co., Waterbury, Conn. He previously had been director of those activities.

—o—

Charles Wohlhuter, vice president and secretary of Burgess-Norton Mfg. Co., Geneva, Ill., has retired and will be succeeded in his post by **Arthur C. Johnson,** who has been with the company for 19 years.

—o—

Walter D. Appel, former chief engineer, has been appointed director of purchasing for Willys-Overland Motors Inc., Toledo, O. Associated with the company since 1946, he was in charge of product development as assistant to the vice president in charge of engineering until 1947, when he was appointed chief engineer.

—o—

E. P. Cunningham has been appointed divisional sales manager of the Detroit office of Clearing Machine Corp., Chicago. He has been associated with the company for 15 years, serving in the engineering, production and sales departments, and as assistant sales manager in the home office. For the past two years, Mr. Cunningham has been the Chicago area sales representative.

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Luscombe Airplane Corp., Dallas, Tex., announces promotion of **David S. Brown,** previously a service department assistant, to assistant service manager of the company.

—o—

William J. Priestley has been elected a director of Union Carbide & Carbon Corp., New York. He has been with the organization since 1923, and has been a vice president of the corporation in charge of the Alloys & Metals Division since 1945.

—o—

George E. Burley, formerly assistant director of purchases, Budd Co., Detroit, has joined the Lustron Corp., Columbus, O., as director of purchases.

—o—

George F. Walker has been named a director of Taylor-Wilson Mfg. Co., McKees Rocks, Pa., and has assumed the position of vice president in charge of sales. **W. M. McConnell** has also been elected a company director, and is now vice president in charge of engineering. Mr. Walker formerly was manager of machinery sales for Mackintosh-Hemphill Co., Pittsburgh, and Mr. McConnell was chief engineer of Mackintosh-Hemphill Co.

—o—

Robert Urquhart has been appointed general superintendent of Lorain Works, National Tube Co., subsidiary of U. S. Steel Corp., succeeding **Bradford C. Colcord,** resigned. Since 1940 Mr. Urquhart has been assistant general superintendent of the Homestead District Works, Carnegie - Illinois Steel Corp., also a subsidiary of U. S. Steel Corp., and is succeeded in that position by **Robert W. Graham.**

—o—

William A. Harding has been appointed assistant to the president of Waterous Co. Ltd., Brantford, Ont. Mr. Harding was formerly Detroit district manager for Jessop Steel Co., Washington, Pa., and had previously been associated with the Crucible Steel Co. of America for about 18 years.

—o—

Leo H. Fait has been elected secretary of Dietrich Bros. Inc., Baltimore, succeeding the late **Walter D. Barnes,** secretary and assistant treasurer.

—o—

Frank B. Stewart has been named assistant manager of the San Francisco district of United States Steel Supply Corp., warehouse subsidiary of U. S. Steel Corp.

—o—

Andrew Westhead has been appointed district sales manager of the New England district, General Electric Corp., in the chemical department at Pittsfield, Mass. Formerly in charge of the department's Springfield, Mass., sales office, Mr. Westhead will make his new head

No Idle Gesture

When operators vote "THUMBS UP" for Cimcool, they really mean it. And no wonder! For this new kind of cutting fluid is better seven ways, from the worker's point of view.

1. Cimcool is clean to work with—doesn't soil hands or clothes.
2. Can't smoke or burn—causes no harmful vapors.
3. Produces no objectionable odors.
4. No slippery film on hands, machine, work or floor.
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6. Cimcool isn't subject to rancidity.
7. Tools and chips actually stay cool to touch.

CIMCOOL DIVISION OF THE CINCINNATI MILLING MACHINE CO.,
CINCINNATI 9, OHIO, U.S.A.

CIMCOOL *for* 85%

Trademark Reg. U.S. Pat. Off.

OF ALL METAL WORKING JOBS

quarters at Boston. **William B. Frackleton,** district specialist in industrial electronic control at Chicago, has been appointed district sales manager of the central district of the chemical department.

—o—

A. Kingsley Ferguson, president, H. K. Ferguson Co., Cleveland, has resigned, and is succeeded by **John Oman,** Oman Construction Co., Nashville, Tenn.

—o—

Ernest E. Brayshaw has been named works manager of the Southwest Steel Rolling Mills, Los Angeles. Formerly assistant division superintendent of Carnegie-Illinois Steel Corp., Clairton Works, at Pittsburgh, Mr. Brayshaw entered the steel business with the Bethlehem Steel Co.

—o—

Joseph Erdmann has been placed in charge of all industrial precision castings produced in both the New York and Chicago plants of the Microcast Division of Austenal Laboratories.

—o—

Oscar P. Noe, R. K. LeBlond Machine Tool Co., Cincinnati, has been made manager of a direct sales and service office for the state of Michigan, recently opened by the company in Detroit. Assisting him will be **Joseph Gebel** and **Clason Shumard.**

—o—

R. L. Baldwin has retired as sales development manager, electrode products, National Carbon Co., Niagara Falls, N. Y.

—o—

Jules Farmer has been appointed Crosley distributor in Port-au-Prince, Haiti, for the Crosley Division, Avco Mfg. Corp.

—o—

Appointment of **William Young** as representative covering the Cincinnati territory has been announced by Udylite Corp., Detroit. He will work out of the Cleveland office.

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Hon. Lamar Hardy, former U. S. attorney for the southern district of New York, and former corporation counsel for the city of New York, has been elected a director of International Business Machines Corp., New York, succeeding **John L. Stainton,** resigned.

—o—

Carnegie-Illinois Steel Corp., Pittsburgh, announces two administrative changes in the management personnel of its Gary sheet and tin mill. **John A. Schwer,** superintendent of production planning at the plant, has been promoted to assistant to the general superintendent, and **Joseph M. Greer** has been appointed successor to Mr. Schwer in production planning. Mr. Schwer has been associated with the corporation since it was organized in 1901.

—o—

Robert S. Hayes and **Carl W. Martin** have been advanced to key operating positions at the East Works plant of American Rolling Mill Co., Middletown, O. Mr. Hayes becomes superintendent of the maintenance department, and Mr. Martin has been promoted to superintendent of the cold strip mill.

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F. D. Weatherholt has been appointed assistant industrial sales manager, Westinghouse Electric Corp., Pittsburgh. **Edward G. F. Arnott** has been appointed assistant director of research for the Lamp Division.

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Louis Siegel has been appointed manager of the Aluminum Division, Levinson Steel Sales Co., Pittsburgh, warehouser and distributor for the Aluminum Sales Division of the Reynolds Metals Co., Louisville.

—o—

A. A. de Carriere has been appointed district engineer for the American Institute of Steel Construction, with headquarters at Dallas, Tex. He succeeds **William Ziegler.** His district is officially known as Area M, and has been extended to include New Mexico. **John G. Hotchkiss** has been appointed district engineer for Area C, with headquarters at New York.

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N. R. Patterson, president and treasurer, Patterson Steel Co., Tulsa, Okla., structural fabricator, was recently elected a director of the National Association of Manufacturers.

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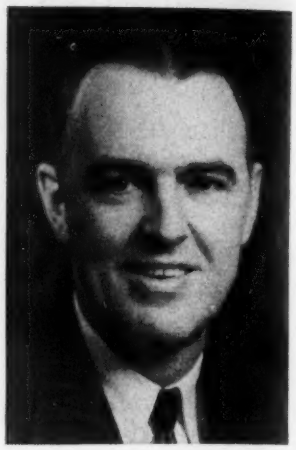
R. W. Langenbach, president, Berger Metal Culvert Co., Westminister, Vt., has been elected president of the Toncan Culvert Manufacturers Association. He succeeds **K. A. Johnson,** president, Wisconsin Culvert Co., Madison, Wis., who will serve as vice president for the next year, and **Harris R. Lunn,** president, Boardman Co., Oklahoma City, Okla., has been elected secretary and treasurer of the association. **H. E. Snyder** has been elected managing director for 1948.

—o—

American Steel & Wire Co., subsidiary, United States Steel Corp., has appointed **John R. Gaut** as assistant manager of Chicago district operations. **Nelson W. Dempsey** has been named general superintendent at Waukegan Works to succeed Mr. Gaut, and **Vernon L. Strohm** has been promoted to division superintendent of wire mills to succeed Mr. Dempsey.



FARREL B. WEBER

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Micromatic Hone Corp., Detroit, announces appointment of **Farrel B. Weber** to the position of sales manager. He has been with the company since 1945, and has assisted in developing machine tool electrical systems and electronic controls for automatic sizing. **A. J. Prentice,** secretary and treasurer since 1931 of the company, has resigned the position of secretary, but retains his position of treasurer. **Gerald Carlisle** succeeds as secretary and continues as assistant treasurer.

—o—

C. E. Cole has been made district manager in charge of the Los Angeles branch for Mack Trucks Inc., New York. **Lawrence D. McLean** has been appointed district manager in charge of the Reading, Pa., branch, and **T. H. Jones,** district manager in charge of the Charlotte, N. C., branch. **William Dudde** has been named district manager in charge of the Bronx, N. Y., branch.

—o—

Stanwood W. Sparrow has been named vice president in charge of engineering by Studebaker Corp., South Bend, Ind., succeeding **Roy E. Cole,** retired.

—o—

Frank M. Mason has been appointed vice president in charge of the Atlantic plant, U. S. Electrical Motors Inc., with headquarters at Milford, Conn.

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Garlan Morse and **Frederick W. Fulle** have been appointed merchandising managers of the Lamp Division and Fixture Division, respectively, of Sylvania Electric Products Inc., New York. Mr. Morse, who formerly

ARTHUR J. WIELAND

Elected executive vice president, Willys-Overland Motors Inc., Toledo, O. Noted in STEEL, Feb. 2 issue, p. 90

LACHLAN MACKENZIE

Elected president, Eastern Stainless Steel Corp., Baltimore. Noted in STEEL, Feb. 2 issue, p. 90

G. F. CLIPSHAM

Appointed assistant to the president, Lincoln Electric Co., Cleveland. Noted in STEEL Feb. 9 issue, p. 66

directed sales activities for both divisions, will now devote his entire time to the merchandising policies, sales promotion, and distribution problems of the Lamp Division. Mr. Fulle will assume the same responsibilities for the Fixture Division.

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R. C. Patterson, D. H. Waite and **H. A. Ford,** executives, Geneva Metal Wheel Co., Geneva, O., have been elected to the board of directors of that company.

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Economy Steel Co., Los Angeles, announces the appointment of **W. Heath Talmadge** as general manager of the company.

—o—

Midvale Co., Philadelphia, announces appointment of **Homer C. Lackey** as district sales manager at Cleveland. He succeeds **Walter B. Smyth,** retiring after 25 years in that position.

—o—

Six new sales appointments have been made in the Stamford Division of Yale & Towne Mfg. Co. as follows: **J. Frank Boxwell** has been appointed manager, trade sales; **Raymond K. Watkins,** manager of builders' hardware sales; **Walter J. Cyr,** manager of door closer sales; **Edward Jones,** manager of trade relations; **John P. Dunphy,** field sales manager; and **H. Warner Hill,** assistant manager, hardware sales.

—o—

William F. Mitchell, superintendent of the Wyandotte, Mich., plant of Pennsylvania Salt Mfg. Co., Philadelphia, has been appointed assistant vice president of the company. **Gustave A. Nelson,** formerly assistant superintendent at Wyandotte, succeeds Mr. Mitchell as superintendent. **Herman J. Eichengofer** and **Hugh C. Land** have been appointed assistant superintendents of the Wyandotte plant.

—o—

F. J. Schaeffer has been appointed assistant director of industrial relations for National Tube Co., subsidiary of U. S. Steel Corp.

—o—

Joseph T. Ryerson & Son Inc., Chicago, announces appointment of **J. L. McDermott** as western sales manager of the Glyco-Ryertex Division, which specializes in the sale of Glyco babbitt metal and Ryertex nonmetallic bearings. Mr. McDermott will make his headquarters at the company's Chicago plant.

OBITUARIES . . .

Jack C. Carlton, 67, president and general manager, Carlton Machine Tool Co., Cincinnati, died of a heart attack, Feb. 3. Mr. Carlton, who also was president of the Calco Machinery Co., Philadelphia, machine tool distributors, was one of the associates of the late William Lodge, one of Cincinnati's pioneer machine tool builders.

—o—

J. F. Corlett, former partner in the firm of J. F. Corlett & Co., Cleveland and Cincinnati, steel sales representative for Lukens Steel Co. and other manufacturers, died recently at his home in Cleveland.

—o—

Joseph C. Gagnon, 59, chief metallurgist, Hudson Motor Car Co., Detroit, died Feb. 6 in that city. He was past president of the American Society for Testing Materials, and had been active with Hudson Motor since 1919.

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Elmer E. Rockwood, 54, associated with Hudson Motor Car Co., Detroit, for 28 years, the past 15 as supervisor of purchasing department, died Feb. 7 in Detroit.

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Emery R. Bales, secretary-treasurer, Wilmington Casting Co., Wilmington, O., died recently.

—o—

Dr. August C. Klein, 61, vice president and engineering manager, Stone & Webster Engineering Corp., New York, died recently.

—o—

William T. Morman, 58, director of personnel for the Cleveland Welding Co., Cleveland, died Feb. 10.

—o—

W. L. Thoma, San Francisco district sales manager, Republic Steel Corp., died Feb. 6 following a heart attack. He held the sales managership for more than nine years prior to his death.

—o—

Charles O. Lineberry, 58, superintendent since 1920 of the Gorgas, Ala., steam plant, Alabama Power Co., died Feb. 7 of a heart attack.

—o—

Claude I. Auten, who retired last year as sales executive of the Tennessee Coal, Iron & Railroad Co., Birmingham, died Feb. 1 in Atlanta.

—o—

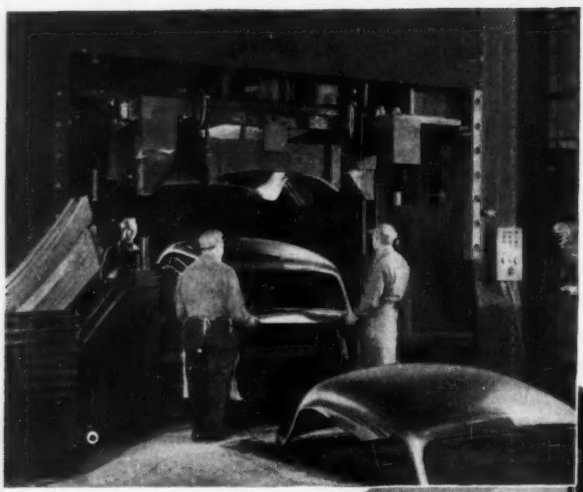
James L. O'Brien Sr., 65, executive general manager, Cleveland Steel Products Co., Cleveland, died Feb. 7.

—o—

Ray G. Aurien, 52, assistant chief mechanical engineer, American Steel Foundries, Chicago, died Feb. 5 in Evanston, Ill.

New Bliss Enclosed Presses

FORMING AUTOMOBILE BUMPERS at high speed in a battery of 750-ton, 2-point presses. Initial and final trimming are completed simultaneously by double dies in 350-ton, 2-point presses.



ENTIRE TOP OF CAR being trimmed in a Bliss 4-point single action press.

FULLY AUTOMATIC PRODUCTION of hub caps in Bliss 2-point press with transfer feed and progressive dies.

IT takes a *complete* line of modern equipment like these new Bliss Enclosed Presses to keep pace with all the changing requirements of new tooling...the intricate shapes and die designs...multiple operations...the increasing trend to automatic production cycles and more economical materials handling methods.

All of these important factors are engineered into the Bliss Enclosed Press line. For example:

Specially designed roll, push, transfer or stack feeds for automatic or semi-automatic operation.

Transfer mechanisms for simple changeover from single to progressive die work.

Latest type push-button operated air friction clutches for intermediate or continuous operation, inching, stop-and-start at any point of the stroke.

Open back designs for feeding front-to-back or left-to-right.

Pneumatic or hydro-pneumatic cushions for deep drawing of complicated shapes.

And there's the added combination of operator safety, improved appearance and cleanliness of operation.

Look over the details of some of the presses described at the right. Let a Bliss Sales Engineer help you to select the right press for your retooling needs ...one-, two-, or four-point; single-, double-, or triple-action...from Bliss' 124 sizes and capacities. If special-type presses are called for, Bliss can help you, too. For Bliss builds more types and sizes of presses—mechanical and hydraulic—than any other company.

Bliss builds more

Engineering News . . . AT A GLANCE

ON-THE-SPOT INSPECTION—Rapid on-the-spot analyses of a varied assortment of ferrous and nonferrous materials without need of transporting samples to permanently located labs are now being made by a mobile laboratory at Ford. The analytical department on wheels includes facilities for a number of specialized chemical and spectroscopic methods and standard physical tests. It serves to integrate more closely services of the chemical department with the demands of production.

IMPROVED HOT ROLLED STEEL—At Cleveland, Otis Works blooming mill of Jones & Laughlin Steel Corp., is being separated from operation of the 77-inch hot strip mill, necessitating rearrangement of handling facilities and construction of new slab heating facilities. While some potential increase in rolling capacity will be gained, basic reason for the change is to improve quality of production.

WEIGHT REDUCER—Weight of passenger railroad cars, it is estimated, will be reduced from 3 to 5 tons by an alternating current-operated "weather factory" developed recently by Sturtevant Division of Westinghouse, Hyde Park, Mass. The unit, soon to be tested on a major railroad, contains its own power plant and necessary air conditioning and heating equipment. Present equipment on the cars requires batteries weighing 4800 to 9500 pounds to operate them when trains are at standstill.

"ROPED" HEAT—Use of a ½-inch wire rope supplied by the Pacific Coast subsidiary of Bethlehem in the under-floor heating system developed by Electradiant Corp., Monterey, Calif., was instrumental in overcoming an audible hum which persisted during the operating cycle of the system. Wire rope cables provided the most satisfactory characteristics for the high-current, low-voltage principle used in the system. In addition the zinc coating imparted to the cable during manufacture protects it against possible deterioration due to normal causes.

SEEKS STRONGER BOILER—From the Bituminous Coal Research Inc., Pittsburgh, it is learned, development is now underway on a boiler design for locomotives that will permit satisfactory operation at pressures higher than the present usual maximum of 300 pounds per square inch. Work is being done by Steam Locomotive Research Institute Inc., research agency of the major steam locomotive makers.

BIG "BLOW" JOB—Weight of air blown into the steel industry's blast furnaces in a year is greater than the combined tonnage of all other raw material used, it was learned from Youngstown Sheet & Tube, Youngstown, O. In 1947, is is estimated that more than 200,000,000 tons of air were used to produce about 45,000,000 tons of pig iron and ferroalloys. It normally takes about 4.5 tons of air per ton of pig iron produced in a blast furnace.

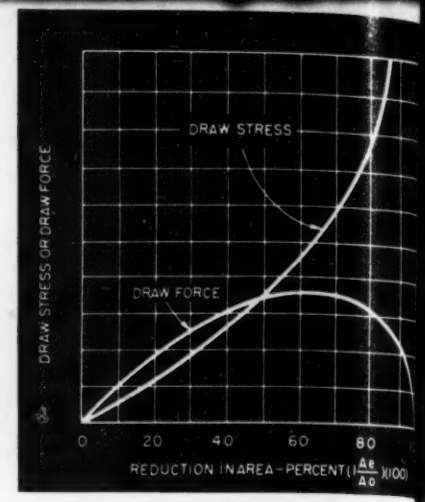
PREDICTS METAL WEAR—Supersonic methods are being used by Allis-Chalmers, Milwaukee, to inspect forgings for a coal-burning turbine locomotive now under construction. Studies of the effect of foreign material in the fluid stream of the gas turbine make it possible to quite accurately predict rate of metal wear under specific foreign matter flow conditions.

SURFACE, A DRAWING FACTOR—In drawing tubular brass, surface condition of the metals is found to affect the process of tube-drawing considerably. Previous qualitative observations, and some measurements clearly showed, during experiments, that freshly pickled specimens require greater draw forces and are likely to rupture than specimens drawn some time after pickling. In addition, surface conditions other than those obtained by exposure to air may greatly affect the draw stress. (p.82)

UNDISRUPTIVE ALIGNING—Master tooling dock which is gaining recognition in heavy industries can be modified to facilitate fabrication of tools for many comparatively small assembly operations. Essentially, it is a three-dimensional positioning device basic members of which are straightedges or one-dimensional positioning elements analogous to straightedges or rules employed by draftsmen. Each edge is supported by and aligned with reference to a framework constructed on a base of adequate stability to permit the straightedges to be moved and aligned with requisite dimensional accuracy—regardless of temperature variations or other disruptive forces. (p. 88).

A GOOD PRACTICE—Much preparatory work is required on new dies before they are pressed into service in die casting. Such work, it is pointed out, corresponds to the setup operations on any production machine. Machine variables are noted and, once the optimum conditions for making castings are determined for each die, it is good practice to list these conditions for future use. Some shops keep the final gate of castings made in a given run of each die stored with that same die. If the die is placed back in service, last casting made helps determine die repairs needed. (p. 90)

CLIPPED BY 2 MINUTES—Time required to analyze carbon content of a steel sample is reduced from 10 to 8 minutes by an improved combustion technique developed recently by H. J. Wolthorn, chief chemist, Youngstown district works of Carnegie-Illinois. Present practice involves use of three electrically-heated furnaces so that a series of six samples can be tested at once. (p. 96).



Included in this article are some results of experimentation conducted at Case Institute of Technology, Cleveland, as part of an investigation sponsored by Frankford Arsenal, Philadelphia. Variations were in tube dimensions ,contour and finish of die and punch, temper and surface condition of tubular parts and lubricant

EFFECT OF PROCESSING VARIABLES ON STRESS REQUIRED IN

Drawing Tubular Brass Parts

By GEORGE ESPEY
Metallurgical Engineer
Lee Wilson Engineering Co.
Cleveland
and
GEORGE SACHS
Research Laboratory for Mechanical Metallurgy
Case Institute of Technology
Cleveland

FORCE and power consumption required to deform a metal by a given type of forming theoretically depends upon a number of factors. In any forming process, the force increases roughly proportional to the average flow stress of the metal and the reduction in cross-sectional area (or any other decisive strain occurring in the process).

Shape of the product exerts an effect which is determined by the state of stress and which differs by only 15 per cent between the two extreme stress states, which are plain strain where strain occurs in only two directions (such as in drawing thin-walled tube), and where two principal stresses are equal (such as in the drawing of rod).

Experimental data now available confirm the conception that these factors almost completely determine the force and power consumption, if friction is absent or very low.

However, in the presence of friction, various other factors also become significant. It appears generally satisfactory to assume that the friction is of the ideal solid type, i.e., proportional to the pressure at the interface between metal and tool. The respective friction coefficient is directly dependent upon the two materials in contact, upon the nature of the lubricant, and probably also upon the condition of the metal surfaces. Little quantitative information is available at present regarding variations in frictional conditions and their effects upon the forces for any forming process.

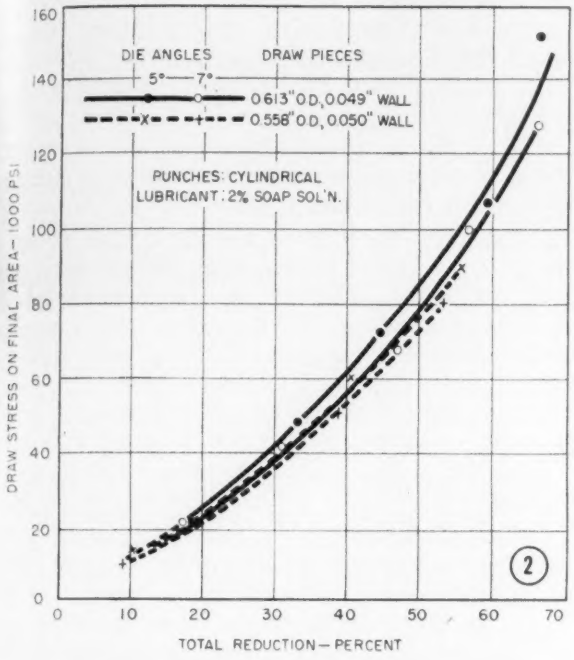
Shape of the tools affects the forming force, according to the simplified analysis, only insofar as it determines the surface area subject to frictional forces. In general, the larger this area, the larger is the contribution of the frictional forces to the forming force and power consumption, other conditions being identical.

Results on a number of variables were obtained from an experimental investigation of the process of cartridge-case drawing which extended over a number of years. As a part of this investigation, numerous tubular parts in both 70/30 brass and spheroidized 1035 steel were subjected to redrawing operations, in order to determine the effects of variables which might affect the performance during production.

A number of these variables were studied to a sufficient extent to yield fundamentally significant relations between the forces required to reduce the tubular section and such variables as the dimensions, the temper, and the surface condition of the tubular part, the contours and the finishes of die and punch, and different lubricants. These data have been reanalyzed, and the conclusions derived regarding the draw stress are presented herewith.

In this investigation, either short pieces cut from tube, or tubular specimens (drawpieces) formed by blanking and deep drawing (cupping and redrawing) were pushed by means of a punch through various circular dies of approximately 0.50-inch diameter. The punch was either cylindrical or tapered. In the case of a cylindrical punch, only one value of reduction and corresponding draw stress was obtained in each test. Therefore, a set of cylindrical punches of various diameters was necessary to obtain different reductions.

Number of tests was considerably reduced by using tapered punches. The diameter and taper of these punches were such as to cover a range from 20 to 90 per cent wall reduction. This "tapered-punch test" yielded a force-stroke curve; from this curve and accurate measurements of the resulting drawpiece with



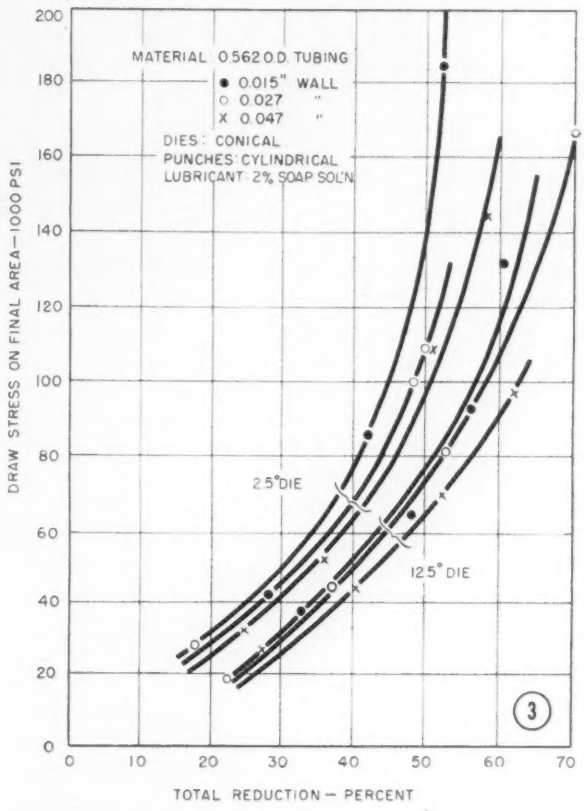


Fig. 1—*General shape of force vs reduction and stress vs reduction curves for metal with constant flow stress.* **Fig. 2**—*Effect of diameter reduction on draw stress at various total reductions.* **Fig. 3**—*Effect of wall thickness and die angle on draw stress*

tapered walls, the draw stress-versus-reduction curve was calculated.

The tapered-punch test was also found of great value for determining the effects of various factors on the maximum reduction obtainable in drawing (drawability). To obtain the "drawability" by means of cylindrical punches, an excessive number of tools and tests are necessary, because of the large scattering.

The tapered-punch tests can be continued until fracturing occurs, yielding the drawability directly. This value is accurately obtained by averaging the results from a sufficient number of tests. While the significance of this value is not quite clear, it was observed on drawing cartridge cases that surfaces and lubricants which increased the drawability in tapered-punch tests, also definitely reduced the percentage of breakage during the experimental production.

Force - Stroke Relations — Tests yielded directly force-versus-reduction curves of the general shape illustrated in Fig. 1. If such a curve extended to reductions larger than 60 per cent, it frequently showed a tendency to flatten out or to go through a maximum. This is apparently a purely mechanical phenomenon, as the draw stresses derived from such a curve increased with the reduction at the expected rate.

The peculiar shape of the force-versus-reduction curve can be readily explained. Assuming that no friction is persent and that the metal is an ideal plastic metal, i.e., possesses a constant flow stress k, the "draw stress" on the final area s_1, is given by the equation

$$s_1 = k \ln A_o/A_e$$

where A_o is the original (or entrance) area of the tube, and A_e is the final (or exit) area of the tube. Consequently the draw force F, is

$$F = s_1 A_e = kA_o(1 - R) \ln A_o/A_e$$

where $R = 1 - A_e/A_o$. The general shape of these two curves is illustrated in Fig. 1.

Force-versus-reduction curves exhibiting a maximum are not observed in other drawing processes, because it is not possible to obtain sufficiently high reductions.

Results of Tests—To determine the effect of a particular variable on the draw stress, it is common practice to determine the draw stress for a number of different decisive reductions. In the case of the tube drawing with a mandrel, the decisive reduction is that in cross sectional area from the original to the final tube. Curves representing the draw stress versus this reduction in area closely follow the trend expected theoretically, as has been shown in a previous publication. This is somewhat surprising, as the actual conditions deviate considerably from the simplified condition subject to theoretical analysis.

In the theoretical analysis, the wall thickness is considered as infinitely thin in comparison to the diameter, rendering the problem one of plane strain. Also, the analysis disregards the fact that the drawing process actually consists of two components. The tube is first sunk to an inside diameter which is equal to the outside diameter of the mandrel, and

then the process of true drawing with a mandrel begins.

This initial "reduction in diameter" depends upon two factors, i.e., the diameter of the tube specimen, and the mandrel diameter. The effect of the diameter reduction on the draw stress has been found to be negligible, according to Fig. 2. This is explained by the fact that the diameter reduction becomes smaller in comparison to the total reduction, as the total reduction increases. Two types of drawing, sinking and drawing with a mandrel, differ only in the contributions of friction.

Therefore if the friction effect is as small as it has been found to be in the drawing of brass tube, the draw stress should be only slightly affected by the difference in the inside diameter of the tube and the outside diameter of the mandrel, if the over-all reduction in area is considered to be the decisive strain. The different-positions of the trend curves in Fig. 2 can be attributed to slight variations in the hardness and grain size of the specimens, rather than to the direct effect of the specimen diameter.

"Wall thickness" of the tube, however, appears according to Fig. 3 to affect the draw stress to an extent which exceeds that of the variations in the condition of the metal. If the wall becomes thicker in comparison to the diameter, the stress state increasingly deviates from the condition of plane strain and approaches that of balanced triaxiality present in a solid bar or wire (i.e., two principal stresses being equal).

This change in stress state should cause the flow stress and, consequently, also the draw stress to decrease gradually to a maximum decrease of 10 to 15 per cent. The curves in Fig. 3 show this trend, the decrease in draw stress with increasing wall thickness being, however, larger than expected. However, this can again be explained partially by variations in hardness. On the other hand, the experimental data indicate that the wall-thickness effect becomes rather large at very high reductions. This fact cannot be explained by any simple conception; it would indicate that the frictional contribution increases considerably when the wall thickness becomes very small in comparison to the diameter.

The surface condition of the metal was found to affect the process of tube-drawing considerably. Previous qualitative observations, and some measurements clearly showed that freshly pickled specimens required greater draw forces and were more liable to rupture than specimens which were drawn some time after pickling. For this reason the general procedure was adopted to expose the specimens to air for at least 16 hours (overnight) after pickling before drawing.

Surface conditions other than those obtained by exposure to air may considerably affect the draw stress. A sulphide coating, created by the reaction of hydrogen sulphide, was found to reduce the draw force slightly. On the contrary, some cups slightly oxidized by heating in air at a temperature of 400° F gave slightly increased drawing forces. Unpickled cups covered with a heavy oxide layer, formed by annealing 15 min at 1100° F, required very high drawing forces, associated with immediate fouling of the die, and breakage of the cups.

Because of metallurgical and processing variations, the hardness and grain size of 70/30 brass may vary considerably. In general, the hardness decreases and the grain size increases with increasing annealing temperature and with decreasing reduction prior to the final anneal. In this (*Please turn to Page* 114)

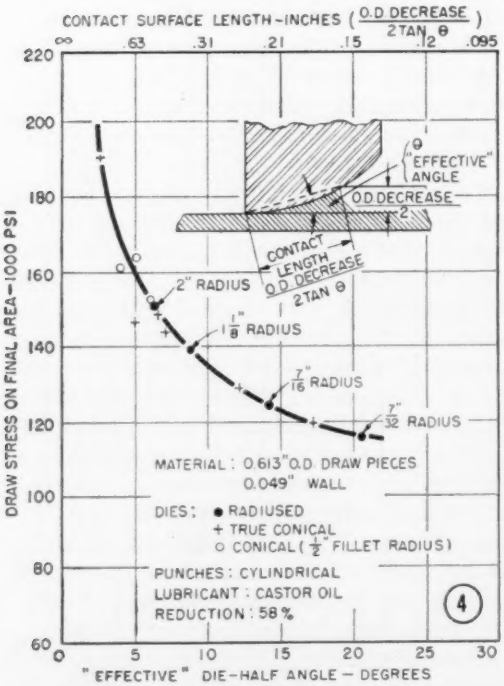
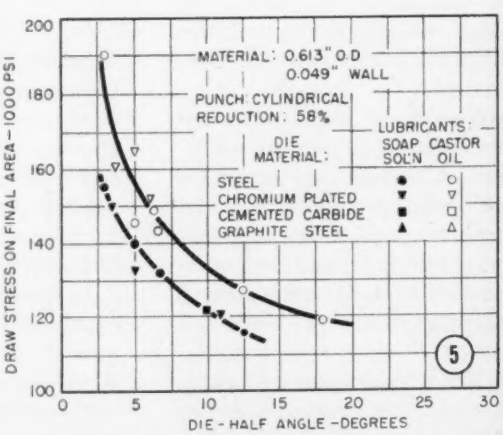
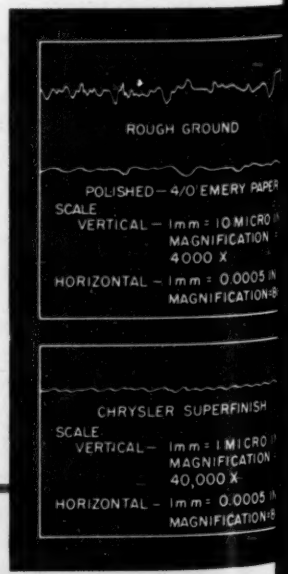

CONTACT SURFACE LENGTH-INCHES (O.D DECREASE / 2 TAN θ)
∞ .63 .31 .21 .15 .12 .095
DRAW STRESS ON FINAL AREA-1000 PSI
220 200 180 160 140 120 100 80 60
θ "EFFECTIVE" ANGLE
O.D DECREASE
2
CONTACT LENGTH = O.D DECREASE / 2 TAN θ
2" RADIUS
1" / 8 RADIUS
7" / 16 RADIUS
7" / 32 RADIUS
MATERIAL: 0.613" O.D DRAW PIECES
0.049" WALL
DIES: ● RADIUSED
+ TRUE CONICAL
○ CONICAL (1/2" FILLET RADIUS)
PUNCHES: CYLINDRICAL
LUBRICANT: CASTOR OIL
REDUCTION: 58%
4
0 5 10 15 20 25 30
"EFFECTIVE" DIE-HALF ANGLE - DEGREES

Fig. 4—Comparison of draw stresses required for radiused dies and conical dies, showing same results when draw stress is plotted against "effective" die angle

Fig. 5—Effect of die material and lubricant on draw stress

Fig. 6—Effect of different finishing techniques on surface finish of punches





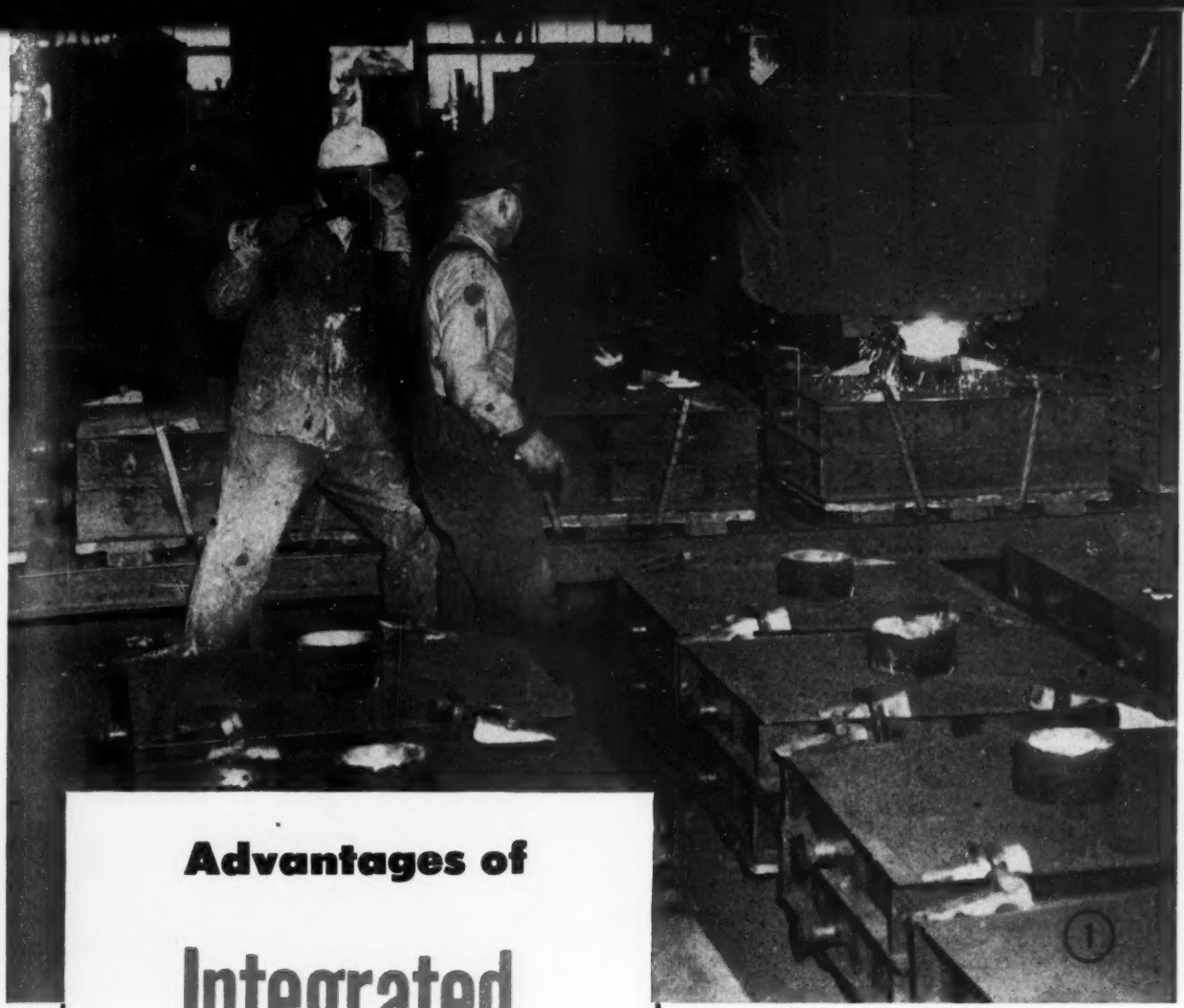


Fig. 1—*Pouring hot metal from ladle into molds in foundry*

Advantages of

Integrated Manufacturing

. . . . . evident at four-division plant of Omaha Steel Works where steel foundry, machine shop, fabricating and manufacturing departments co-operate closely to produce components for earth-moving equipment, snow plows, dozers

By GERALD ELDRIDGE STEDMAN

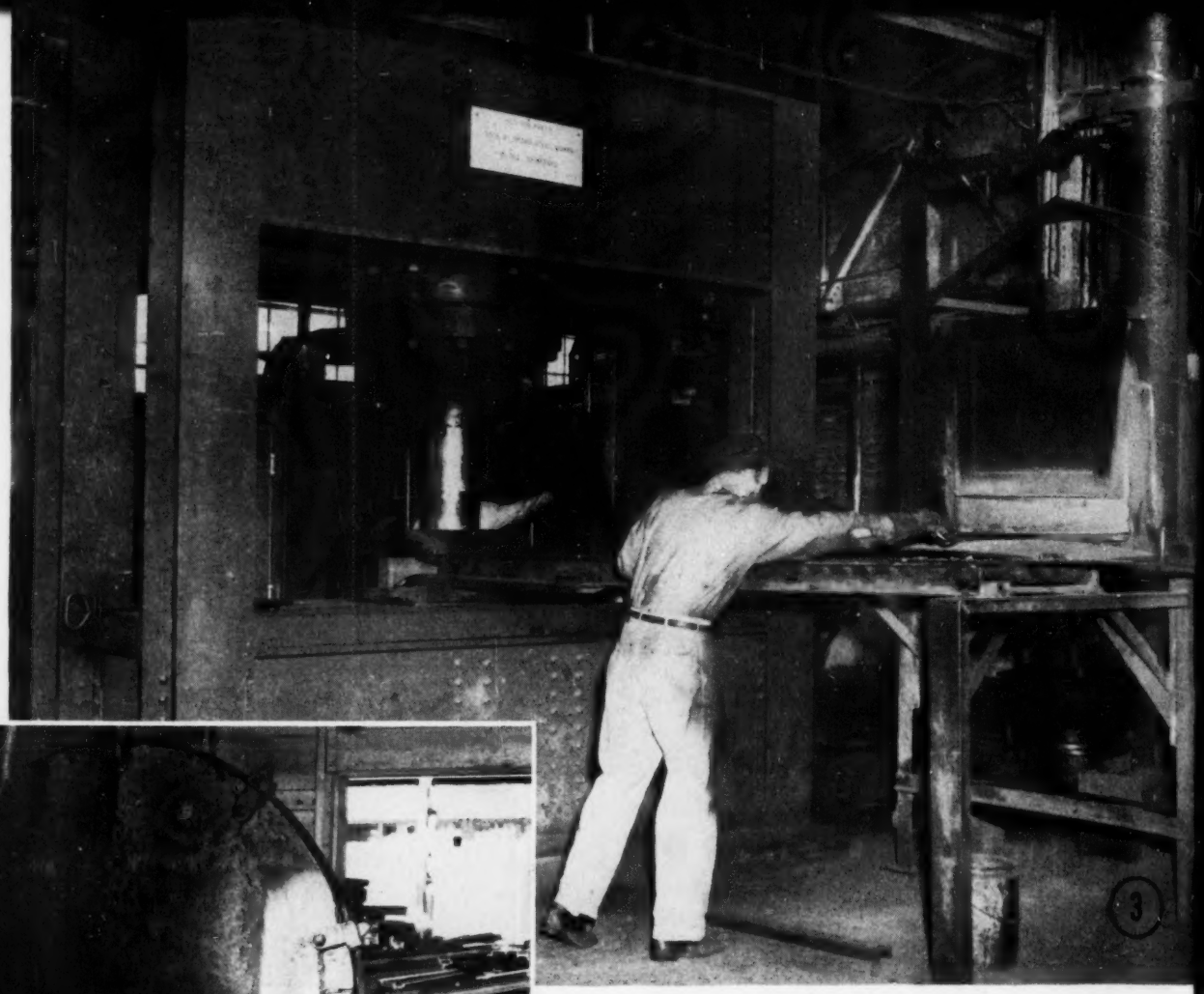
ONE of the accelerating industries in Omaha, Nebr. is the Omaha Steel Works, founded in 1906 by John W. Towle as a small steel fabricating shop which has since grown to a 15-acre plant with eight main buildings, engaged in four major divisions of activity: Steel foundry, machine shop, fabrication and manufacturing. The company piled up a war production record in a wide variety of casting and machining components as well as in marine production of LSTs in its eight-way shipyard on the Missouri river.

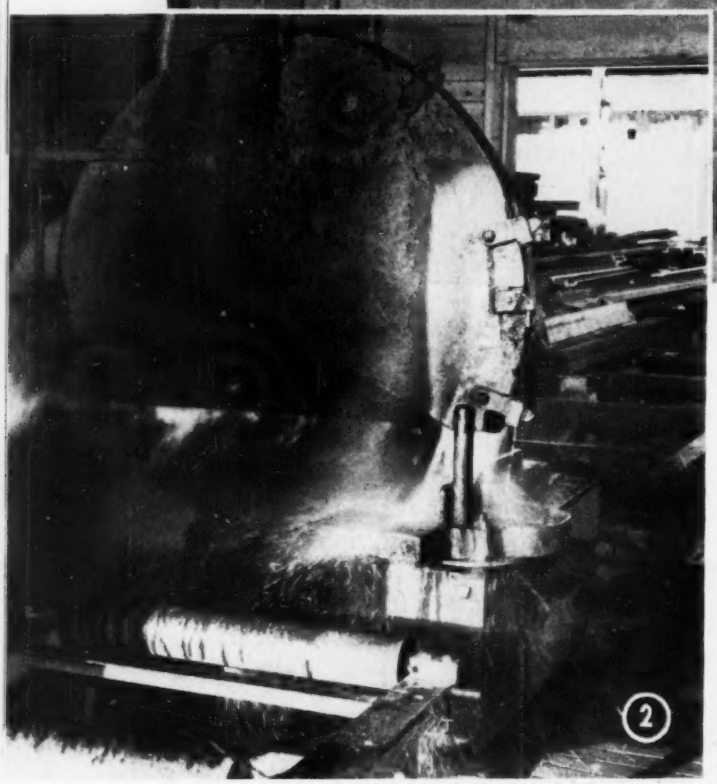
Omsteel's steel foundry, which forms the main subject of this article casts 85 per cent of its volume for outside customers, works on 15 per cent in its machine shops. Castings are largely for earth moving equipment, railroads, tonnage work for smelters, such as ladles and kettles. Its capacity is 600 tons per month. It uses electric furnace; part of its pour is alloyed.

Machine Shop—The machine shop is principally concerned with processing castings. It does no press-work. Most of the work is on heavy machinery items. The fabrication division manufactures tanks, towers, bridges, structural work. Its range is South Dakota, Wyoming, Kansas, Oklahoma. The company now depends upon contractors for field erection.

As a supplement to its facilities, the concern decided to enlarge its manufacturing capacity and is now setting up for important production as a manufacturing supplier to Caterpillar on such items as dozers, snow plow and wing assemblies, scrapers and varied subassemblies involved in production of earth-moving equipment.

The 500 x 55-foot machine shop, serviced by 25-ton overhead craneway has line flow from north to south. Equipment includes model 401 Cutamatic machines, capable of cutting 5-inch rounds in 90 seconds, No. 2L Gisholt turret lathes with 22-inch swing





and a No. 5, both handling bar stock up to 2½-inch diameter, working on shafting pins and screws. A Bullard vertical turret lathe, 54-inch diameter bed, 60 revolutions per minute, ½-inch feed was working on cylinder heads for locomotives, using 0.018 feed at 11 revolutions per minute cutting high speed cast steel with Carboloy tool bits. A companion Niles boring mill, 60-inch diameter bed is used for the same class of work.

There are also two Denver semiautomatic lathes, war products of Stearns Rogers-General Iron Works. These are special lathes built to turn 155 millimeter shells of which Omsteel produced millions. They are now converted to good peacetime use. The lathe department has two Duo-matics, eight engine lathes used to machine spindles for farm machinery and trailer hub castings, each machine being served by overhead swing crane.

A LeBlond heavy duty miller was turning a slot in a fork at 125 revolutions per minute and 0.030 feed. Other millers were cutting keyways in shafting. A Bausch multidrill with 45 spindles, drilling and reaming in tandem, was drilling the cutting edge with ¾-inch diameter holes at 50 revolutions per minute, tolerace 0.001-inch. Two 18 x 24-inch slotters were machining driving boxes. These were T. C. Dill Machine Co., Philadelphia, slotters.

A Fosdick radial drill with a 6-foot arm, 4-inch diameter, turning at 325 revolutions per minute, 0.020 feed was doing snow plow wing work. Three Whitcomb-Blaisdell planers, 10 x 20-foot bed size, using 15 strokes per minute, cutting 0.012-inch stroke, were being used to form grooves on plow frames. Nothing much in the heavy machinery line this shop cannot set up to do. Omsteel does 75 per cent of its own tooling.

Fabricating Department — Large facilities are assigned to the fabricating and manufacturing divisions. All shop detail here originates in the engineering department. Much engineering ingenuity is evident around the plant. Engineering passes board work to production for scheduling and routing. Omsteel's 40 x 90-foot template shop prepares wood

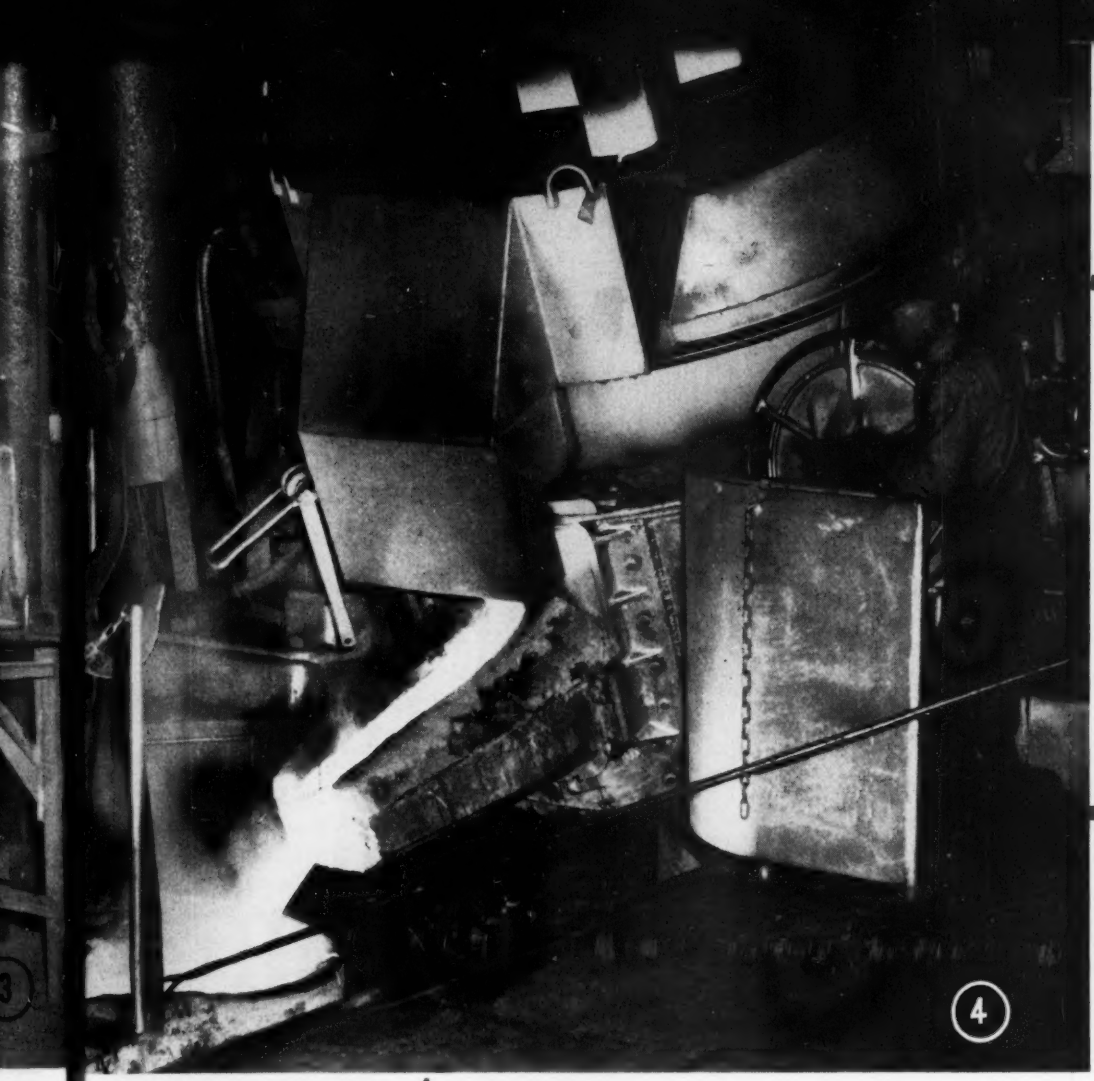


Fig. 2 — Cutting steel with friction saw

Fig. 3—A company-built furnace and press

Fig. 4 — Pouring heat from Lectromelt furnace in foundry

templates for bridges, towers and tanks, consisting of such structural work as wide flanges, standard sections, plates, bars.

The receiving department is in the open and is served by overhead crane. Back of it is the outdoor receiving storage with a 400-foot long, 72-foot span craneway and its 25-ton crane. Receiving area cuts and saws beams and channels, shears plates and angles, accomplishing such burning as is specified. It is in the open. A Ryerson 6000-ton structural friction saw, 52 inches in diameter and water cooled, travels at 1800 revolutions per minute, using a blade softer than the material, cuts through steel as if it were wood. Very little chipping of burrs has to be done after the cut. A Cincinnati 10-foot by ¾-inch automatic brake and a 6 x 6 x ¾-inch angle shear are part of the equipment. The 5 per cent scrap here goes to foundry for salvage.

Layout department, 72 x 300 feet, has a center and two side bays, accommodated by overhead and swing cranes. Linde acetylene equipment is used in burning. Punching equipment includes one plate, one rack, two regular Hill & Jones punch presses. Bertsch 12-foot ¾-inch forming rolls, a 5 x 12-foot 90-ton straightener press to accommodate the great amount of arc welding employed, particularly on the bulldozer, is some of the equipment in this manufacturing division. Cowling machines to square ends of structural steel, a 12-foot horizontal boring mill for bridge beams, a large riveting and welding area for structural, accommodated by a 20-ton crane, which ends in a cleaning section from which work is moved to outside painting and storage, an area served by a 65-foot span, 300-foot craneway, contained such diversification as gates, snow plows, prefabricated material for bridges, structural beams.

In the manufacturing department, production of five snow plows and wing sections per day has been attained. Manufacturing starts at shears, the work being cut to size, formed and moved to various locations for welding. There are 10 welding stations in the 40 x 320-foot welding building. Some 100 parts are involved in plow and wing assembly.

Unique welding fixtures are employed. All work is down-welding. Welding equipment includes 65 direct current Lincoln 200, 300, 400-ampere and 12 alternating current 500 ampere units and one Unionmelt automatic welder.

Scraper and dozer building welding and assembly line was receiving installation of a 50-ton 6 x 14-foot straightener. A new 20 x 80-foot heat treat department is being installed.

Another 200-foot square building is given over to forge and ornamental work. Here stairways, railings, hatch frames, tractor lifts, radiator guards for earth-moving equipment are produced. Erie air hammers and bulldozers are used in forging. A Dreis & Krump 10-foot by ⅜-inch brake is used in ornamental forming. An HPM 400-ton (*Please turn to Page* 119)

Master Tooling Dock

. . . finds numerous applications in heavy industries to minimize production tooling costs

By FRANK CHARITY

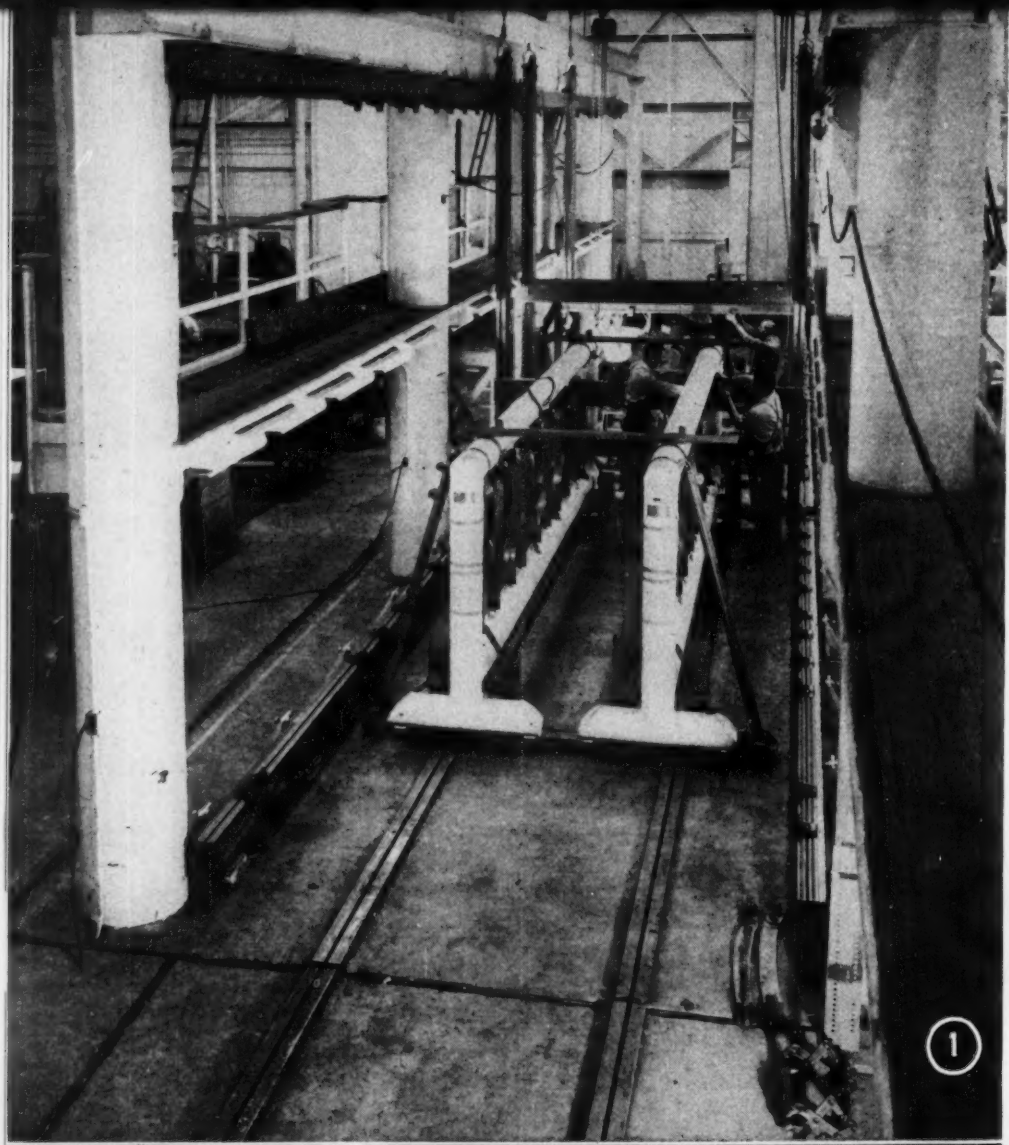


Fig. 1—End view of master tooling dock installation showing two picture-frame assembly fixtures in process of fabrication

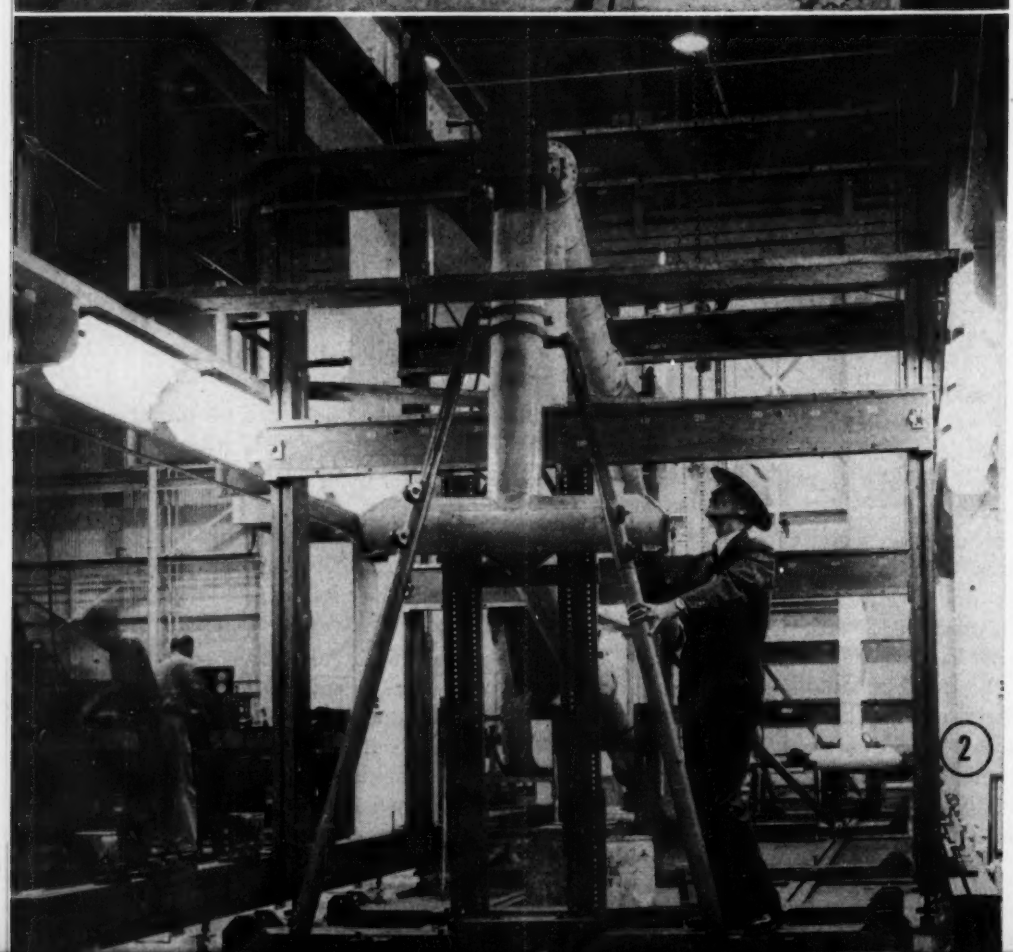


Fig. 2—Leland A. Bryant, inventor of the master tooling dock inspects a fixture whose locators are being positioned with the aid of tooling dock straightedges

Fig. 3—When strip templates are not required for permanent or repeated usage, the microbar shown here can be used to position movable straightedges and to determine third-dimensional locations in the master tooling dock

ALTHOUGH the master tooling dock was conceived and developed to serve as a universal master for the jigs and fixtures required to mass-produce America's World War II aircraft, the demand for streamlined structures from postwar production lines has been so great that manufacturers in a variety of industries have sought this instrument as a means of minimizing their production-tooling costs.

At this writing, the most important advantages of the dock appear to be materializing in the so-called "heavy industries"—such as the manufacture of railroad cars, locomotives, automobiles, and boats. For example, Brill Motors officials recently announced savings amounting to more than 50 per cent of the cost of a truck-production tooling program had been achieved with one of the more recent tooling-dock installations. However, engineering tests have indicated that the dock can be modified to facilitate the fabrication of tools for many comparatively small assembly operations—including those necessary in the manufacture of trunks, safes, special types of office equipment and furniture, presses, and special types of engines.

In essence, the master tooling dock is a three-dimensional positioning device whose basic members are "straightedges" or one-dimensional positioning elements which are analogous to the straightedges or rules employed by draftsmen. Each of these straightedges is supported by and aligned with reference to a superstructure or framework, which is constructed on a base of adequate stability and from materials of sufficient rigidity to permit the straightedges to be moved and aligned with requisite dimensional accuracy—regardless of temperature variations, earth tremors, and other disruptive forces which can normally be anticipated.

At Consolidated Vultee Aircraft Corp., where the first full-scale dock was erected in 1943, it was found possible to maintain the alignment of dock members to a tolerance of plus-minus 0.001-inch with inspections and adjustments of the supporting structure every three months. Some of the structural members comprised steel sections in lengths up to 60 feet, and their extreme dimensional stability was achieved by mounting the dock framework on a "floating" concrete base with pilings extending 40 feet below the concrete surface of the factory floor.

When extremely close tolerances are necessary, the alignment of tooling dock members can be accomplished with exacting accuracy by means of electrically energized wires, an electronic mercury level, and master gages. In any event, the straightedges and their functions can be listed as follows: (1) Longitudinal straightedges represent station lines or length dimensions. (2) Vertical straightedges represent water lines or height dimensions. (3) Transverse straightedges represent buttock lines or width dimensions.

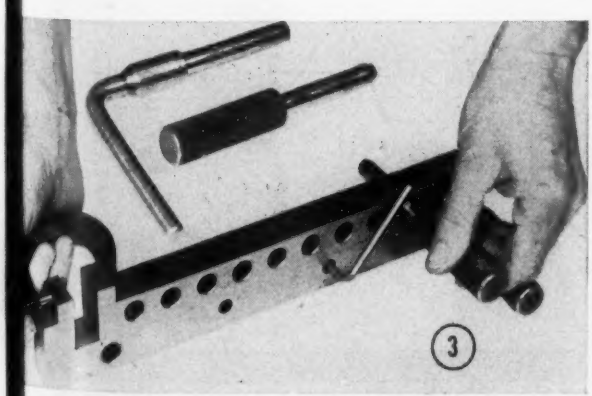
Only the longitudinal straightedges are permanently or immovably attached to the tooling dock structure. The vertical straightedges are movable fore and aft on the longitudinal straightedges, and the transverse straightedges are movable up and down on the vertical straightedges.

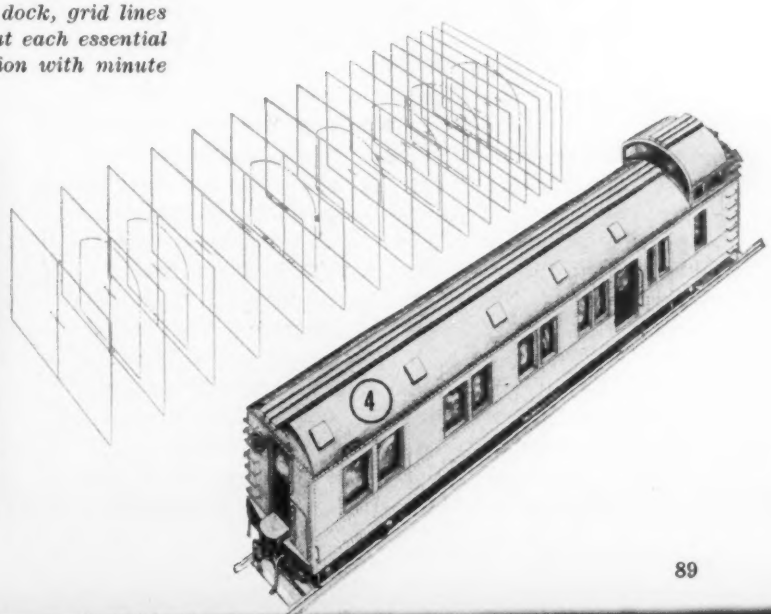
Accurately-located tooling holes at unvaried intervals on the straightedges serve as attachment units with which dowel pins and microbars or strip templates can be used to position the movable members and various locating elements which serve as dock accessories. Because the basic reference lines are the same for each new operation, no guesswork is involved in positioning the straightedges and a third dimensional location can be ascertained with reference to the transverse straightedge with unidirectional micrometer precision.

When the third dimension location for a specified operation is achieved with a template or gage on the transverse straightedge, it is a simple matter to position the locator required by a rough jig or fixture structure, which has been set up in conformity with the reference lines of the dock, and to tool-proof that location without trial-and-error mating operation.

The master tooling dock has been used in fabricating both masters and production tools in various factories. Generally speaking, masters should be produced when the need for (*Please turn to Page* 124)

Fig. 4—Illustrated here is a railroad car alongside a schematic sequence of grid-line layouts of the type that would normally be used in tooling up for railroad car production. In the master tooling dock, grid lines of these layouts are represented by straightedges so that each essential tooling location can be projected into the third dimension with minute accuracy





MODERN Die Casting Practice

Various types of casting machines and processes, die construction and materials are described in this second article of the current series

By R. J. REEL
Die Casting Engineer
Hydraulic Press Mfg. Co.
Mt. Gilead, O.

SINCE the die casting process involves forcing molten metal under pressure into a closed die, the casting machine must perform these functions: It must first securely clamp the die halves, as the applied pressure of the metal tends to force apart the front and rear portions of the die. Total pressure tending to open the die equals or approximates the injection pressure applied to the metal, in pounds per square inch, times the projected area of the casting itself, plus the area of the runners and the sprue hole or biscuit.

As this force is considerable, the die clamping required to confine the metal pressure within the die, must be great and exceed the pressure tending to force the die open. Besides clamping the die and injecting molten metal, the machine must open the die when the casting has solidified, to permit its ejection, after which the die must be closed again and clamped to start a new cycle.

Die casting machines are of two basic types: (1) Cold chamber injection machines for casting aluminum, brass, magnesium and other high melting point nonferrous alloys; (2) submerged plunger injection machines for casting zinc, tin, lead and other low melting point alloys. Die casting machines normally employ either (a) full hydraulic die clamping in four tie rod frame, or (b) mechanical toggle die clamp in bar or beam type frames. This article deals principally with machines employing full straight-line hydraulic die clamping as manufactured by Hydraulic Press Mfg. Co. Such designs have been offered commercially only in recent years.

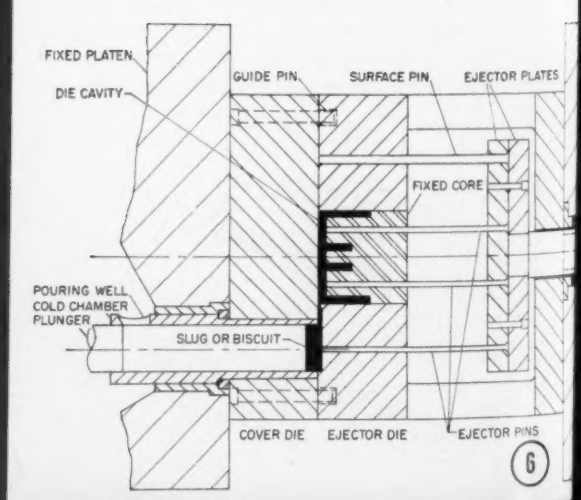
With full straight-line hydraulic clamp, live pressure backs up the die at all times when it is in closed position. Rigid frame "dead center" toggle machines, when stretched sufficiently to permit die opening have no "follow-up" in closed die position. As long as toggle links or cams are correctly adjusted, dies can be adequately locked.

Probably the greatest asset of the full hydraulic die clamp lies in its ability automatically to adjust itself for dies of various thickness, thus minimizing die set-up time. With straight-line hydraulic motion, pressure build-up occurs wherever resistance is met, and this may be anywhere within the limits of the die clamp travel. Toggle clamp designers have recently developed a single screw die height adjustment to overcome the previous time-consuming adjustment of four tie bar nuts and four lock nuts.

Normally this screw adjustment must be made twice, once when setting-up the die, and again to compensate for metal expansion when machine and die are hot. Toggle clamp machines operate at a high rate of speed. To obtain such speeds with full hydraulic clamp design, H-P-M has fitted the large clamp ram with a small, fast-closing internal booster ram, and all but a small fraction of the entire die stroke is accomplished with the high speed booster ram.

Actually, this design permits an even faster cycle because of the elimination of shock and die impact. Hydraulic clamping affords complete flexibility of control—any pressure or speed. Because of the unusual heavy duty construction of die platens, plus the fact that the movable die platen is backed-up by a hydraulic ram of large area, there is little chance for die deflection under load.

Toggle machines have fixed stroke, while full hydraulic machines have adjustable stroke permitting the return stroke to be only that required to withdraw the casting from the machine easily. This feature saves considerable time in the overall cycle. Some large machines have built-in hydraulic ejectors,



as well as controls for pulling cores hydraulically, when required. Core movement is protected by limit switch control; cores must be where they belong before cycle can progress.

With cold chamber machines, the machine operator employs a hand ladle to charge the cold chamber for each casting cycle, after the die has been closed. Hot metal is injected into the die by the ram when a foot switch is closed. Thereafter, the machine runs through the remainder of its cycle automatically, each event occurring in precisely timed relation.

This cold chamber injection system for aluminum, magnesium, and copper alloys provides high injection speed and an instantaneous and positive application of high final injection pressure on the metal as it chills in the die. This limits and prevents the formation of shrinkage voids and greatly reduces in volume, any entrapped air or gases, still present. Castings are sound and relatively free of porosity. Castings so produced in these high pressure machines can pass 100 per cent x-ray inspection and can be used in some stress applications, even at times replacing forgings.

Dies last longer when relatively slow injection speed is used, there being less thermal shock and less erosion. Thus an adjustable injection speed control makes it possible to prolong die life, especially when die casting brass.

Submerged Plunger Machines—In using submerged plunger machines, designed for casting zinc and other low melting point alloys, the operator does not handle metal except periodically to feed additional metal into the pot. A good zinc injection system consists of an iron pot within a gas or oil fired furnace from which molten zinc is delivered by hydraulically actuated plunger working in a submerged cylinder, through a gooseneck and a nozzle, into a die held tightly closed by hydraulic clamping. Action is timed so that injection can take place only after maximum predetermined pressure is built up on the die. Injection elements—pot, plunger, gooseneck, nozzle—must all be capable of withstanding high temperatures, in ad-

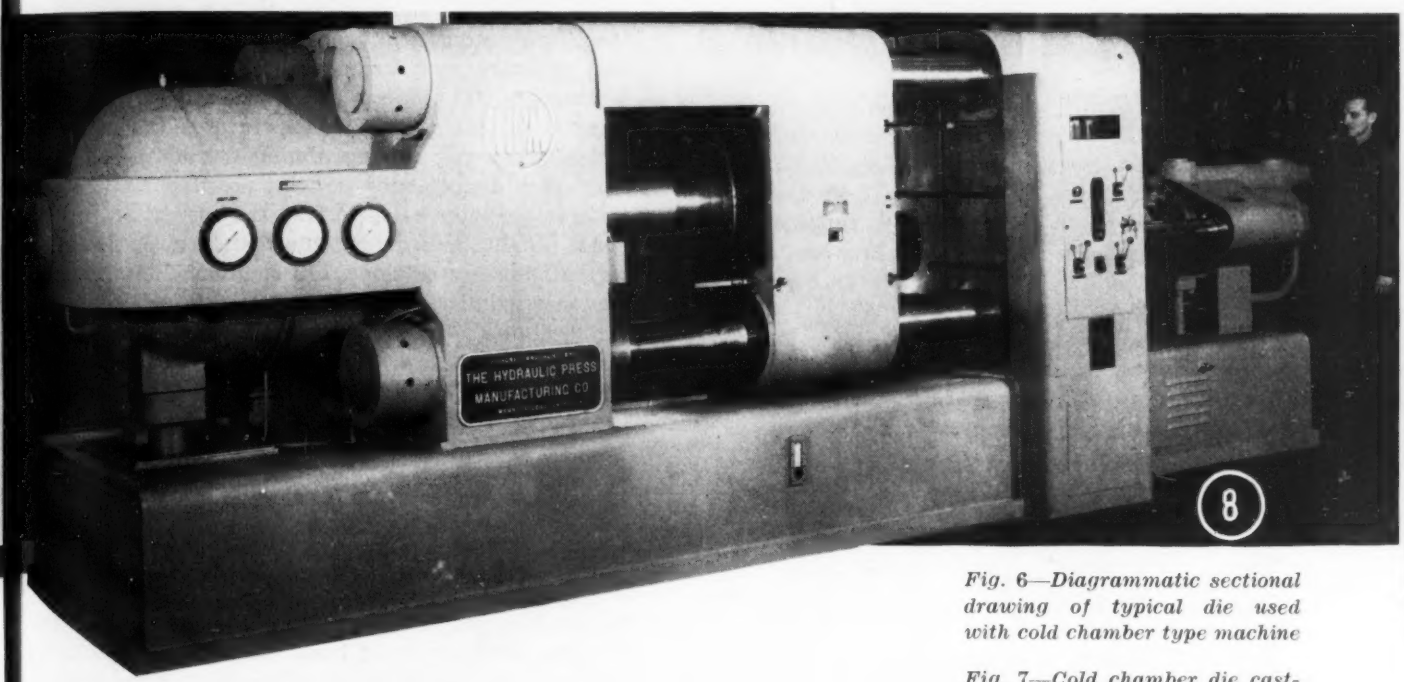


Fig. 6—Diagrammatic sectional drawing of typical die used with cold chamber type machine

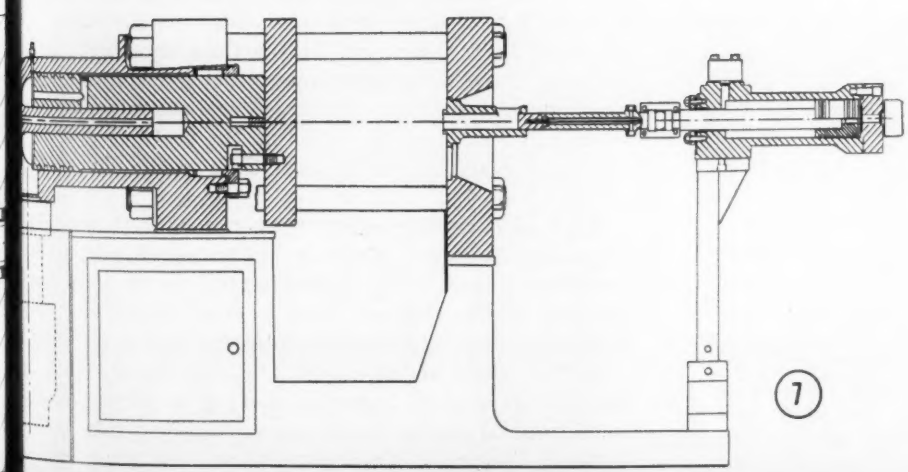


Fig. 7—Cold chamber die casting machine for casting aluminum, magnesium and copper alloys. Left side of machine consists of a straight-line hydraulic die clamp for clamping die during injection. Small internal booster ram inside large clamp ram provides rapid closing of the die. Hydraulic cylinder and ram assembly on right side powers injection plunger used to force molten metal into die

Fig. 8—Large H-P-M die casting machine capable of casting up to 90 pounds of aluminum per "shot." This unit is designed with 1000-tons straight-line hydraulic clamp

dition to the erosion of the molten zinc. This is provided through the use of suitable heat resistant metals—iron alloy castings produced by careful foundry practice.

Furnace and pot are round, flame is tangential, combustion and heat transfer are efficient. Pot has uniform section, thereby minimizing heat strains; this results in long pot life. Injection cylinder liner and plunger are nitrided. Plunger has cast iron rings for long service. High injection speed and control give excellent results in producing castings that are sound, relatively free of porosity, having smooth, "hardware finish" surfaces which can be easily prepared for plating.

Injection Speeds Controllable—Injection speeds are controllable up to the relatively high maximum. Cycle control including timed dwell for chilling and ejection of the castings are all controlled on the automatic cycle by a single electric timer. Manual cycle is used for tryout before production runs.

Women sometimes operate machines when the castings are light enough for them to handle. Skill is required in setting up the die and in getting it and the machine adjusted to function to the best advantage.

In some cases, die temperatures have to be closely maintained. The operator checks each casting by glancing at it, also noting its surface finish to see that the die operates as intended. If an ejector pin is bent or broken or the die fails to function as intended, the operator must "spot" these quickly and stop the machine until adjustments or repairs are made.

Some plants depend upon the operator to "spot" defective castings and sometimes to remedy the cause. In other cases, an inspector at each machine examines the castings, removes them from the gates and informs the operator at once, if rejects are produced, so that remedy can be found and faults corrected before the rejects accumulate in quantity. Occasional inspection in many plants is done with x-ray or fluoroscope.

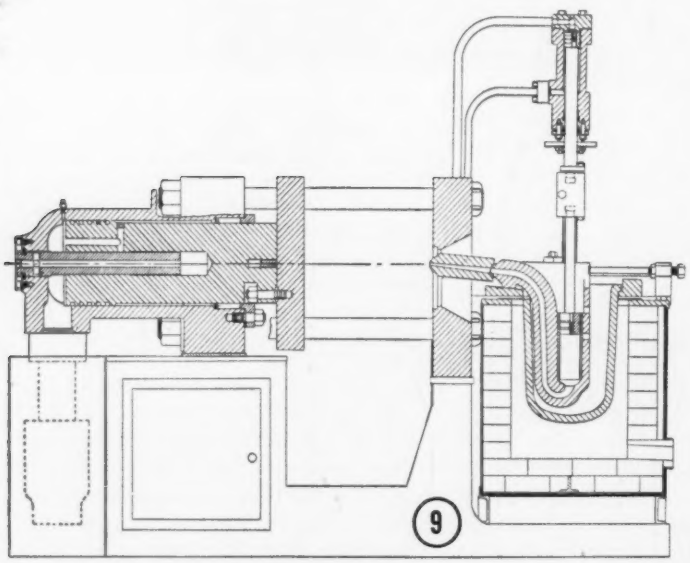


Fig. 9—Submerged plunger type die casting machine for casting zinc, lead, tin and antimony alloys. Metal pot and furnace are integral part of the machine. This machine is designed with all-hydraulic action and is powered with a self-contained hydraulic power unit. Machine cycle is automatic and can be rapidly repeated

In many plants having long runs of castings, these are passed at once along conveyor or similar lines where gates and flash are removed, any necessary machine work is done and the castings are packed for shipment. Often the flash, runners, sprues and biscuits, as cut or broken from the castings, are dropped onto conveyors for return to melting furnaces.

When dies, especially new ones, are first put into operation, both machines and dies have to be adjusted to yield the required results. New dies must often have the gating or venting altered or extra overflow wells or pockets provided, before acceptable castings are produced. Such work corresponds to the setup operations on any production machine in which the tooling has to be altered or adjusted until it functions properly.

Machine variables which sometimes have to be altered, include: Setting the timing controls when these are automatically operated, altering the injection pressure and sometimes the injection velocity, adjusting metal temperature to suit the particular die being used, changing die temperatures through control of the water cooling, timing the motion of movable cores and ejection devices, possibly altering the plunger diameter so as to feed the correct amount of metal, finally determining the fastest cycle for making satisfactory castings. In some machines, the injection nozzle location can be altered to suit the varying location of the sprue hole, in various dies.

It is good practice, once the optimum conditions for making castings is determined for each die, to list these conditions for future use.

Some shops keep the final gate of castings made in a given run of each die, stored with the die so that, before this die is put back into service, the last casting it made can be examined to determine what, if any, die repairs are needed.

Die Construction and Materials — Before die castings can be produced, suitable dies must be provided. All dies are made in at least two separable parts because the die must be opened to remove the casting. If the casting has external undercuts, which are often necessary to secure the desired shape of casting and to avoid having sections thicker than necessary, one or more movable slides may be used to permit the casting to be ejected. Slides add considerably to die costs and result in extra flash on the castings but the advantages attained often more than justify the extra costs.

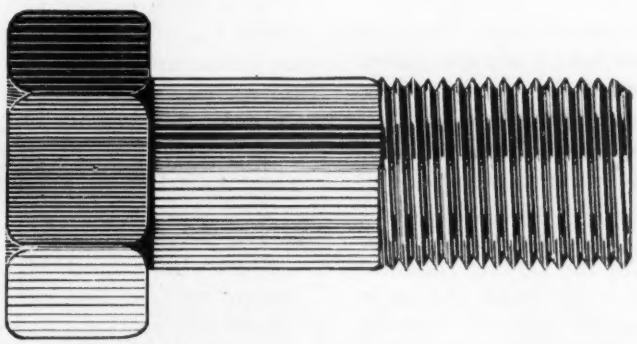
Most dies require some cores, not only to provide necessary holes and recesses, but to insure maximum economy in metal and, consequently, lower costs per casting. Cores that are fixed to either the main portion of the die or to a slide are usually the cheapest but they must be so shaped, located and actuated that their removal from the casting is accomplished as the die is opened or as the casting is ejected. In general, the axis of fixed cores must be either parallel to the die motion or to the motion of the slides.

Cores that have angular motion relative to that

Six hired men,

plus the power of a bull on a treadmill (to blow the fires), were combined in 1843 to produce 500 bolts daily, an impressive achievement at that time.

This was the crude set-up in the Connecticut blacksmith shop of Micah Rugg. His astounding production record of 500 bolts a day was the talk of the trade, and other bolt manufacturers sat up to take notice. From early beginnings like this, the metal fastener business grew to its present size and importance, reaching its greatest development in the United States. CHANDLER PRODUCTS CORP., manufacturers of cold wrought engineered products, is proud to be a member of an industry pioneered by men like Micah Rugg. Today, however, instead of using the power of a bull on a treadmill, and the help of six hired men, we have ingenious automatic machines and crews of skilled mechanics. Standard makes or special designs, metal fasteners of uniformly high quality flow from our plant constantly. They help hold together the motors and machines of today and tomorrow.



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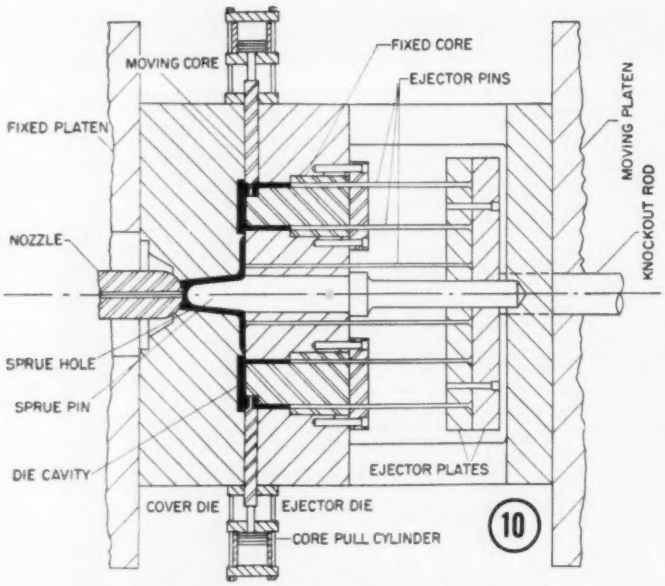

Fig. 10—Diagrammatic sectional drawing of typical die used with submerged plunger type die casting machine

portion of the die in which they are located, are often necessary, but such cores may require separate actuation and must be locked against motion during the "shot." A rack and pinion is commonly used for manual actuations but cores operated by hydraulic means have advantages.

Cores moved by mechanical means are often arranged for automatic operation as the die opens; hydraulically operated cores can be pulled automatically or through hand-operated controls, either before or after the die is opened.

All movable cores leave flash at one or both ends, usually requiring removal in an extra operation, unless it occurs at a point where the flash can be sheared off when the main parting flash is removed.

Movable side cores in the fixed front or "cover" portion of the die should be avoided unless an interlock is provided to insure pulling the core before the die is opened. If the operator fails to pull a manually-operated side core in the fixed portion of the die before the die is opened, the core, casting, or die will be broken when opening takes place. For this reason, movable side cores are nearly always placed in the rear or ejector portion of the die, but these too must be removed before ejection takes place.

In most dies, ejection pins are provided in the ejector portion of the die. These are actuated after the die is opened in such a way that the casting is pushed out of the die cavity and off any fixed cores in the ejector portion of the die. As the casting solidifies in the die, it shrinks onto the cores; hence the cores must be given some draft, or slight taper, so that the slight motion of the casting frees it from the core. Side walls of the die usually also require some draft, even though the casting shrinks away from the die walls as it cools.

Ejector pins usually end flush with cavity walls, and must be so placed that the pins do not distort or unduly mar the surface of the casting against which they press. In general, ejector pins are all attached to a common ejector plate in the back of ejector portion of the die; means must be provided for forcing this plate forward, ejecting the casting.

Ejector plate may be arranged for manual actuation, but faster cycles are obtained when bumper bars are used, with actuation accomplished by the return motion of the movable die platen. In the large H-P-M machines, a separate hydraulically operated ram automatically actuates the ejector plate.

After ejection, pins must be returned to their prior position, flush with the die cavity wall. This is usually accomplished by two or more heavy flush pins attached to the ejector plate and projecting through to the die parting, outside the die cavity. These flush pins come forward with the ejector plate and, when the die is closing, their ends strike the cover portion of die thus being pushed back to flush position.

A tube or sleeve, surrounding a core, may be used in place of ejector pins, particularly to eject narrow, circular castings, but, as it must fit the mating surfaces, both inside and outside, and is subject to wear, the sleeve ejector has disadvantages. Ejector pins and sleeves are usually surface hardened and ground and should make a good fit in the holes in which they slide. They must be replaced when wear causes excessive flash; their holes may have to be reamed out to overcome eccentricity and to accommodate larger pins.

Ejector plates move inside a hollow structure, usually called the "ejector box," which spaces the die away from the movable press platen. This box is often a welded one, or a steel or iron casting, and must be sturdy enough to support the die against the heavy locking pressure applied to it. It must often also provide space for a plate to actuate one or more movable cores that may project through the back of die.

Some dies require no ejector; in such cases, the opening of the die and withdrawal of cores, releases the casting so that it can be lifted out of the die, without sticking. This occurs in the dies in which movable cores are the only means of holding the casting within the movable die half.

Dies must be designed so that the casting will remain in the ejector portion as the die is opened. Castings always shrink onto cores and, if there are cores in both ejector and cover portions, those providing the greater holding force must be in the ejector or movable portion. For this reason, most of the volume of a casting is formed in the ejector portion although it may also shape much or all of the exterior, especially when there are slides or side cores which lock the casting positively in the ejector portion so that, in opening the die, the casting is pulled free of the cover portion.

Ejector pins must be strong enough to eject the casting without bending or breaking and must not distort the casting. Usually, pins are so placed as to bear against supported bosses or ribs of the casting or on sections which are thick enough to take the pressure, without deflection. As the pins make marks on the casting, they should be so placed that (a) marks are not detrimental to appearance, (b) marks will be removed by necessary machining operations, or (c) pins bear on runners, overflow wells or flash, so that no marks will appear.

(To be continued)

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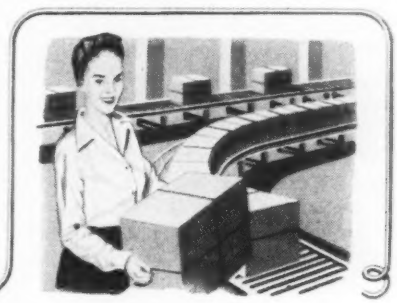

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Speeds Carbon Analysis of Steel

TIME for analyzing carbon content of individual steel samples at one steel plant is reduced from 10 to 8 minutes by an improved combustion technique carried out at a temperature of 1100°C (2012° F)—about 60°C higher than the former procedure used. The rapid determination method perfected recently by H. J. Wolthorn, chief chemist at the Youngstown, O., district works of Carnegie-Illinois Steel Corp., also involves simplified preparation of samples with a resulting improvement in accuracy.

Three electrically heated furnaces, using nonmetallic resistor heating elements, are each equipped with two silica tubes, so that a series of six samples can be undergoing test at the same time. The furnaces are arranged in a compact group, side by side, with their fronts aligned, as shown in the accompanying photograph. Rated at 1.4 kilovolt-ampere maximum input, the units are controlled by individual ammeters and temperature indicating instruments of the millivoltmeter type, with transformer switching means that provide power input at between 45 and 190 volts in 5-volt steps. The silica tubes are 36 inches long, and 1 inch inside diameter.

Samples of steel for analysis are approximately 1-1/3 grams, their exact weight having been chosen as half the factor weight to simplify calculation. Equipped with a visual aid, the chemical balance employed in weighing operations can be read with comparative ease to the fourth decimal place, reducing operator fatigue and increasing accuracy.

Kaolin clay boats are used to contain the samples during testing. Each boat is used for two individual tests, the first sample being placed in one end of the boat, and the second in the opposite end. Use of the clay boats and elimination of bedding material for the sample has increased accuracy of carbon determinations by reducing chances for contamination.

Average number of tests at this United States Steel Corp. subsidiary plant is 180 every 8 hours for the three double-tube furnaces, using two operators. The balance operator confines his efforts to the required weighing operations and supervision of the order of charging the samples into the furnace tubes. His assistant merely places the weighed samples in the porcelain boats, charges them into the proper furnace tube, and removes them after each test is complete. An individual timer for each furnace tube is placed within easy reach and sight of the balance operator.

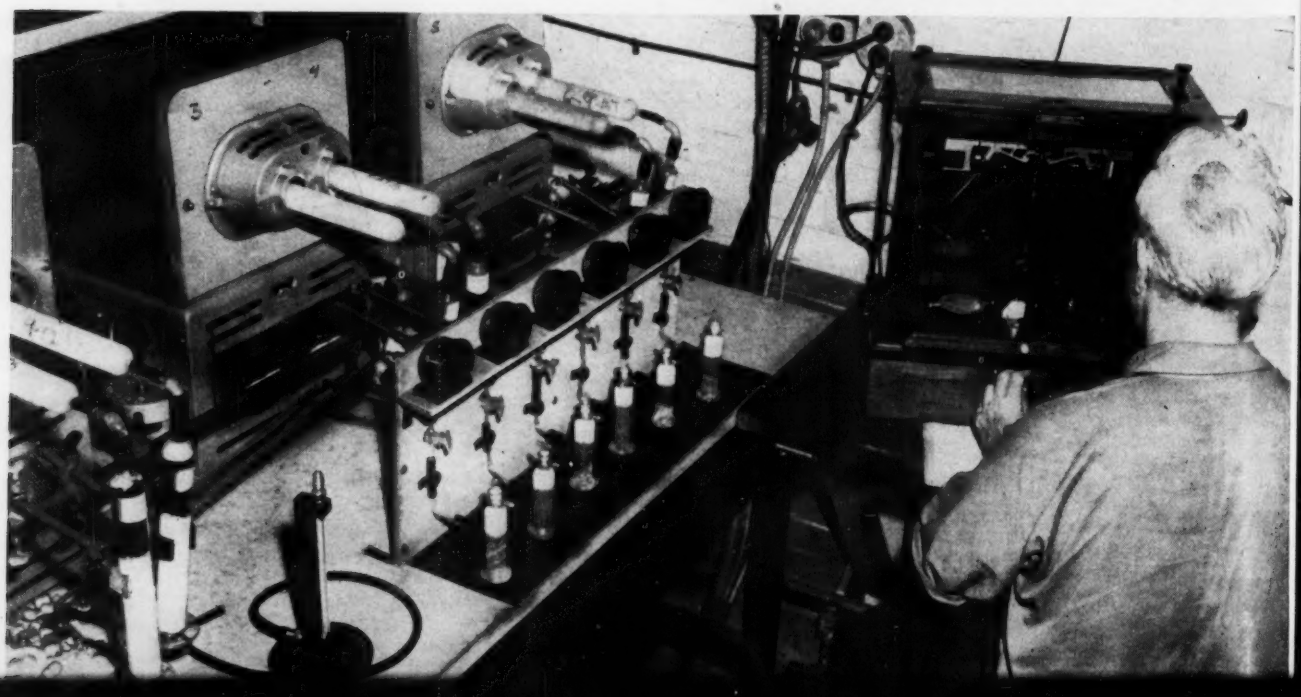
Oxygen is supplied to the silica tubes in the furnaces from a manifold that carries the gas to all six tubes. Before entering the manifold, the oxygen is passed through a soda-lime tower which removes carbon dioxide from the gas. A mercury manometer indicates the pressure, and consequently the flow rate, of oxygen to the manifold.

Contained in its clay boat, the sample is pushed into the silica tube to come to rest in the high temperature zone of the tube, and the oxygen connection is made to the tube. Oxygen flowing through the tube combines with the carbon in the steel at this high temperature to form carbon dioxide. The effluent from the combustion tube is led into a column containing manganese dioxide in its upper third to absorb sulphur in the gas, and magnesium perchlorate in the bottom two-thirds to absorb water vapor.

From this column, the gases are led to the weighing bulb, which contains magnesium perchlorate in its upper third and a mixture of commercial lye shaken with iron ore in the bottom two-thirds to absorb the carbon dioxide in the gas. Absorption of carbon dioxide by the reagent in the bulb increases the weight of the latter, and this increase in weight forms the basis for calculation of the amount of carbon in the sample, expressed as per cent. The iron ore in the weighing tube acts as an indicator to show when the absorbent needs replacement with fresh material. A rotameter type instrument measures the rate of flow of effluent gases from the weighing tube after the carbon dioxide has been absorbed.

This simplified absorption train reduces the number of rubber connections required by former trains of greater complexity, thus reducing chances of leakage and error.

View of rear ends of carbon analysis furnaces, showing effluent drying towers and carbon dioxide absorption bottles. These are weighed before and after each test to determine weight of carbon dioxide formed, thus providing a basis for calculating carbon content of steel. Timers above absorption bottles control duration of test



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Utilization of Oxygen in SMELTING LOW-GRADE ORES

Results of experiments with oxygen-enriched air in low shaft German blast furnaces producing pig iron and ferrochrome are described. Use of oxygen in excess of 24 to 26 per cent increases manganese in slag drastically. High temperature has little effect on furnace lining

By DR. W. M. POLLITZER
Technical Industrial Intelligence Division
Department of Commerce
Washington

EXPERIMENTS with oxygen-enriched blast in the United States seems to have concentrated on open-hearth practice, and, to a smaller degree, on the blast furnace. Germany took a different way. For many months or years pig iron has been successfully produced from normal or low-grade ores (or low-grade fuel), ferroalloys from ores otherwise considered substandard and high-quality steel in basic converters with great additions of cold scrap.

The Gute Hoffnungs Huette plant, Oberhausen, Rheinland, was the first big steel combine in Germany, and, as far as it is known, in the world, to build a blast furnace for experiments with oxygen-enriched air. This decision was largely made owing to the invention of Frankl to produce oxygen cheaply by his new generator system. Frankl sold his patents to the Linde Air Co. and the building of all plants according to his invention was executed by that company, the plants generally being called the Linde-Frankl plants.

A small blast furnace, Fig. 3, 13.12 feet high and 7.87 feet hearth diameter, was built in 1933. It was built particularly steep in order to avoid any possible difficulties with hanging. The bottom and hearth were made of carbon bricks and the bosh and shaft were lined with fire bricks. The closed steel jacket of the bosh and shaft was water-cooled according to German standard practice.

The furnace, which was first run with normal air, consumed approximately 50 to 65 tons of coke per 24 hours. As different types of ore were melted, the output figures vary considerably. They lie between 50 and 70 tons per 24 hours. Sample figures for hematite are given in Table I.

After it had been found that the furnace worked well under normal conditions, experiments were started with oxygen-enriched air. Oxygen was added to the cold air before it entered the hot blast stoves. The maximum percentage of oxygen reached at the Oberhausen plant was 35 per cent, but mostly only 24 to 26 per cent of oxygen in the air was used. The air containing the oxygen was preheated as usual to 750 degrees Centigrade. The Linde plant itself was built for the production of 158,914 cubic feet of air containing 45 per cent oxygen of 1.5 atmospheres pressure. The blast pressure was kept at 5.8 pounds per square inch. The pressure of the oxygen added to the blast was 6.19 pounds per square inch.

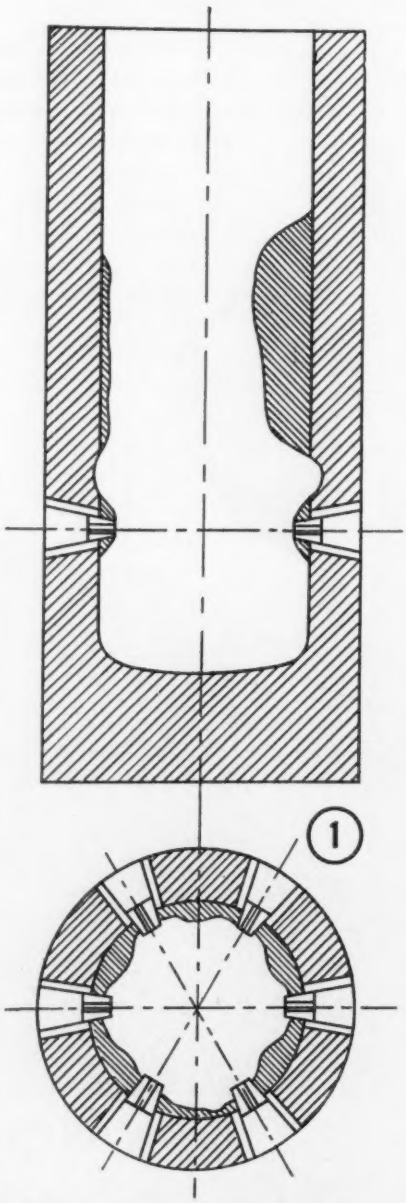


Fig. 1—Section through the lining of the Trostberg furnace after 3-months' wear

Table I gives a good indication of how blast furnace changes produced with oxygen compare with those without oxygen.

Experiments with oxygen-enriched blast convinced the management that this method of pig iron production was an economic one, particularly when low-grade indigenous ores have to be used.

They therefore ordered a new plant from the Linde Air Co. after the complete destruction of the old equipment. The new plant is supposed to produce oxygen of 75 per cent purity, and this oxygen was to have been added to the air in cold state immediately before the tuyeres, whereas the balance of the air was to have been preheated in stoves as usual.

The Oberhausen experiments proved that taking normal blast furnace procedure with hot blast stoves, increases of oxygen to a maximum of 30 per cent lowered the production costs considerably. Every increase in oxygen in the blast reduces the total quantity of blast, as five parts of hot air are replaced by one part of pure oxygen. The preheating of the charge by the air and gases moving upward and the indirect reduction in the blast furnace, however, are not done as effectively with smaller quantities of air. A point is finally reached where the reduced quantities of air cool to such a de-

gree on their way through the shaft that temperatures of less than 100 degrees Centigrade are observed in the escaping gases. Insufficiently preheated charges move into the melting zone and proper working is endangered. Engineers at Oberhausen used a higher oxygen concentration than 26 per cent, but did not find it successful. They found among other difficulties that more than 24 to 26 per cent of oxygen blown into the blast furnace increased the content of manganese in the slag to a dangerous point.

The lining stood up to the high temperatures as long as the furnaces were well water-cooled. Tuyeres made of good copper of standard design also proved fully satisfactory.

It has been shown at Oberhausen that all technical metallurgical problems connected with oxygen-enriched blast up to approximately 26 per cent can be mastered without difficulty. Low-grade ores can be smelted and a bigger yield achieved. The economy depends on the production costs of oxygen.

The most interesting example of oxygen-enriched blast in German iron and steel industry is at the Suddeutsche Kalkstickstoff Werke, Trostberg, in Eastern Bavaria far from all raw materials necessary for iron and steel production. The plant was built because of cheap power. A strange situation existed insofar as the manufacture of fertilizers produced oxygen as a byproduct (nitrogen being the main product) from the Linde plant. This oxygen was blown through the chimneys in large quantities.

In order to utilize this cheap oxygen the German Government Board responsible for the technical co-ordination of the iron and steel industry, decided that a low shaft blast furnace using high concentrations of oxygen, should be built at Trostberg. Pig iron, and if possible, ferrochromium, and perhaps alumina should be manufactured there.

As previously mentioned, the limit in the increase of oxygen in blast furnaces is set by the height of the furnace. There is no point in enriching the blast and at the same time decreasing the total quantity of air beyond an optimum.

This stage lies at a point where the gas temperature leaving the top has a temperature of approximately 100 to 120 degrees Centigrade. The hot combustion gases (CO + N, CO etc.) are cooling on their way through the shaft and with decreasing quantity of gas the cooling to 120 degrees Centigrade will be reached in shorter space than with the greater additions of nitrogen in normal air. After reaching the temperature of 120 degrees Centigrade the gas does not add any more to the preheating of the charge nor to indirect reduction of ores. Consequently the part of the furnace above the 120 degrees Centigrade limit becomes superfluous unless special circulating gas would be inserted as in electric blast furnaces.

Recognizing these facts a small low shaft furnace was built. The

Fig. 2—Section through the low-shaft blast furnace at Trostberg, Germany. Stack was lined with straight inwall and was 21 feet high from iron notch to top

Fig. 3—Lines and dimensions of stack at Gute Hoffnung Huette plant

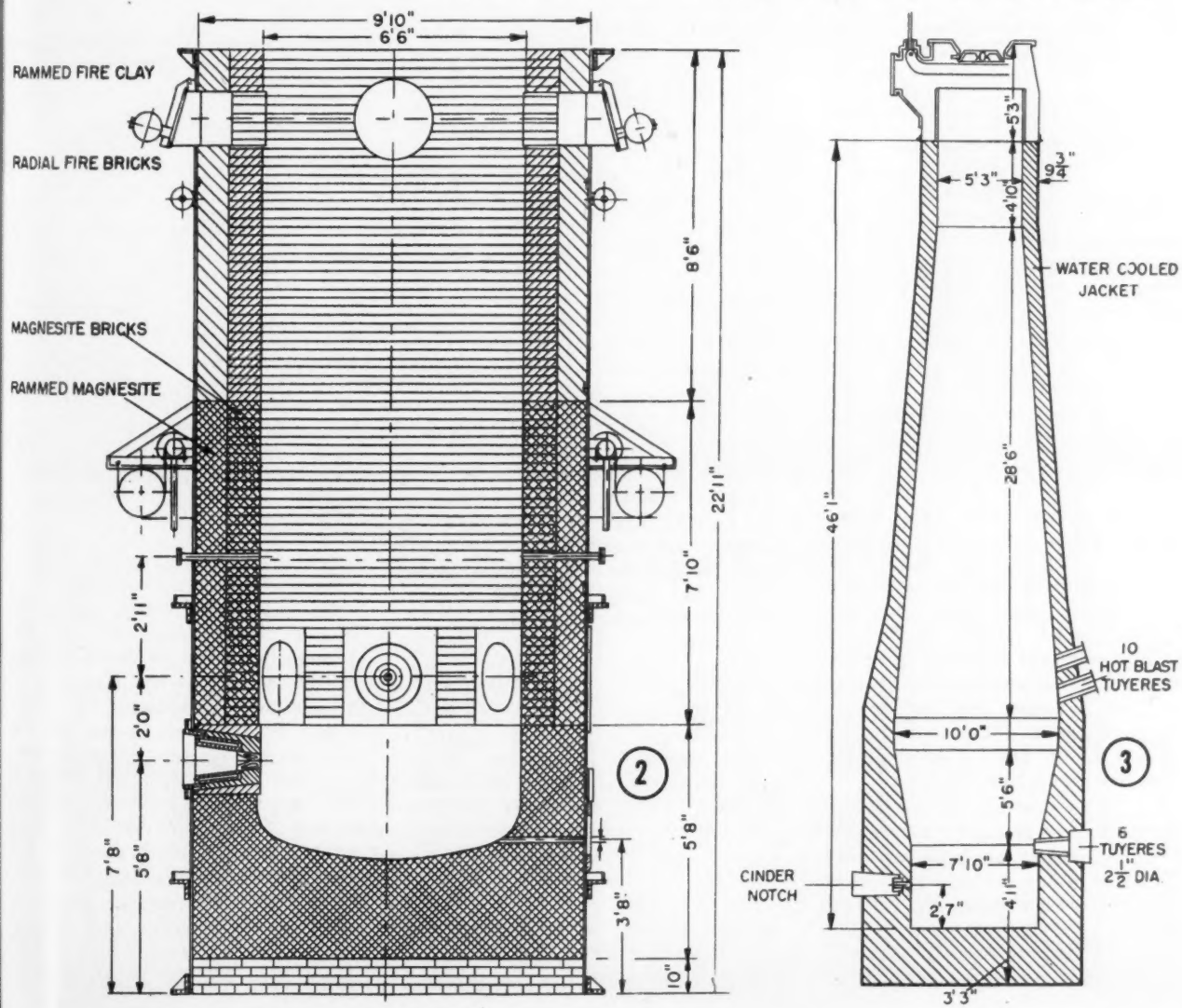


TABLE I
RESULTS OF OXYGEN-ENRICHED BLAST COMPARED WITH NORMAL BLAST USING HEMATITE ORE

	Normal Air Blast	Enriched to 24% O_2	Enriched to 26% O_2
O_2 in blast, %	21.0	24.0	26.4
Pig iron produced per 24 hours (tons)	43.1	51.0	52
Coke consumption, lbs./ton of iron	2325.9	2061.3	1959.9
Hot blast temperature, ° Cent.	742.0	770.0	730.0
Top gas temperature, ° Cent.	364.0	258.0	205.0
Analysis of pig iron, %			
Carbon	4.16	4.11	4.20
Manganese	1.3	0.68	0.86
Silicon	1.9	2.07	2.1
Sulphur	0.02	0.018	0.012
Slag produced, lbs./ton iron	1045.0	1047.2	.....
Slag analysis, %			
SiO_2	29.0	34.0	33.0
CaO	45.0	50.0	50.0
MgO	4.8	2.7	3.1
Al_2O_3	14.3	9.2	8.5
Mn	0.6	0.3	0.4
Fe	1.2	0.8	1.1
S	2.7	1.7	1.8
Temperature of iron, °C.	1375.0	1355.0	1380.0
Gas produced cu. ft./ton iron	155,028	124,023	111,249
Saving of coke, %	.....	11.0	16.0
Increase in production, %	.....	19.0	.....

TABLE II
RESULTS OF EXPERIMENTS AT OBERHAUSEN ON OXYGEN-ENRICHED BLAST
(Ore used—low grade German acid ore)

	Normal	Enriched
Ratio CaO:SiO_2	0.79	0.79
Oxygen in blast, %	21	25.5
Top temperature, ° Cent.	235	175
Slag/ton pig iron, lbs.	3241	3197
Coke per ton iron, lbs.	2854	2632
Pig iron production, tons/day	61.4	79.2
Saving of coke, %	.....	8.0
Increase in production, %	.....	29.0

total height of this furnace was 19.03 feet, the distance between the bottom of the crucible and tuyere level was 1.97 feet and from tuyere level to stack 15.09 feet. The maximum height of the charge above tuyeres was 11.48 feet. Six water-cooled copper tuyeres of standard design of 1.97 inches diameter supplied the necessary blast. The outer furnace diameter was 9.84 feet, the inner one, 6.56 feet. The top was closed by a normal double bell and hopper arrangement. (See Fig. 2).

The furnace was well-cooled by two rows of plates, six plates being in the higher and 12 in the lower row. Additional cooling was provided by extensive application of spraying rings.

The furnace was lined, from crucible to tuyere level with carbon bricks. From tuyere level upwards for 6 feet, all through the melting zone, the furnace was lined with magnesite bricks, and further up with standard good quality fire bricks. No preheating of air or oxygen took place. A small compressor for oxygen and a larger one for air furnished the blast. The oxygen pipes led into the air main at approximately 20 feet from the furnace.

The only campaign on the production of pig iron lasted for four weeks. It proved fully that pig iron could be melted successfully in such small blast furnaces without any difficulties.

An Austrian ore from the Erzberg, i.e. roasted spathic iron ore with 41 Fe, 14 CaO, 8 MgO, 7 SiO_2, 4 Al_2O_3, and 2 per cent Mn was charged. In addition burnt turnings and shavings were charged in small quantities. Normal blast furnace coke with pieces up to 3.54 inches was charged. No difficulties were experienced with smelting. The blast was put on and the content of oxygen in the air was gradually increased up to 36 per cent.

Pig iron produced showed very low contents of carbon and manganese. The carbon content ran 2 to 3 per cent maximum, the manganese 1 per cent, whereas the slag contained 4 to 6 per cent manganese. Pig iron smelted in normal blast furnaces from the same ores contained 2.5 to 3.0 per cent manganese and 3.5 to 3.8 per cent carbon. The explantion for this phenomenon was found in the large size coke. Apparently the great rate of travel in the furnace and the relatively small surface of large coke in combination with low indirect reduction caused unsatisfactory reduction of manganese.

Gas temperature at the furnace top reached 200 to 300 degrees Centigrade.

A change in dimensions of coke and a further increase of oxygen brought the remedy. From 40 to 42 per cent oxygen and selected coke between 0.59 to 1.57 inches produced iron (from the same burden as above) with the following analysis:

Element	Per cent
Carbon	3.8
Manganese	2.1
Sulphur	0.02
Silicon	1.0
Phosphorus	0.09

The content of manganese in the slag decreased to 2.2 per cent with 39 CaO, 33 SiO_2 and 2 per cent Fe. The ratio:

$$\frac{CaO - MnO}{SiO_2 - Al_2O_3}$$

worked out at approximately 1.3. Gas analysis showed 42.3 CO and 9 per cent CO_2. The thermic value of the gas measured at 1300 calories. Coke consumption per ton of pig was 3086 pounds. Pressure at the tuyeres was kept at 15.47 pounds per square inch.

The silicon content, 1 per cent of the pig iron, seems low and proves that concentrated heat can be applied in a shaft furnace without the reduction of too much silicon. Low contents of phosphorus and sulphur were under those produced with standard methods.

The burden for the production of ferrochromium contained low grade chromium ores from the Balkans with the following average analysis:

Element	Per cent
Chromium	18.0
Cobalt	2.4
Magnesium	22.0
Silica	10.2
Alumina	11.5
Iron	9.0
Manganese	Trace

This ore was mixed with 40 per cent spathic iron ore of the previously mentioned composition and a small addition of 2 per cent quartz and 3 per cent fine ore was made.

Such low content of chromium in the ore would not warrant production in electric furnaces. But the low shaft blast furnace worked without trouble and smelted ferrochromium with the following analysis:

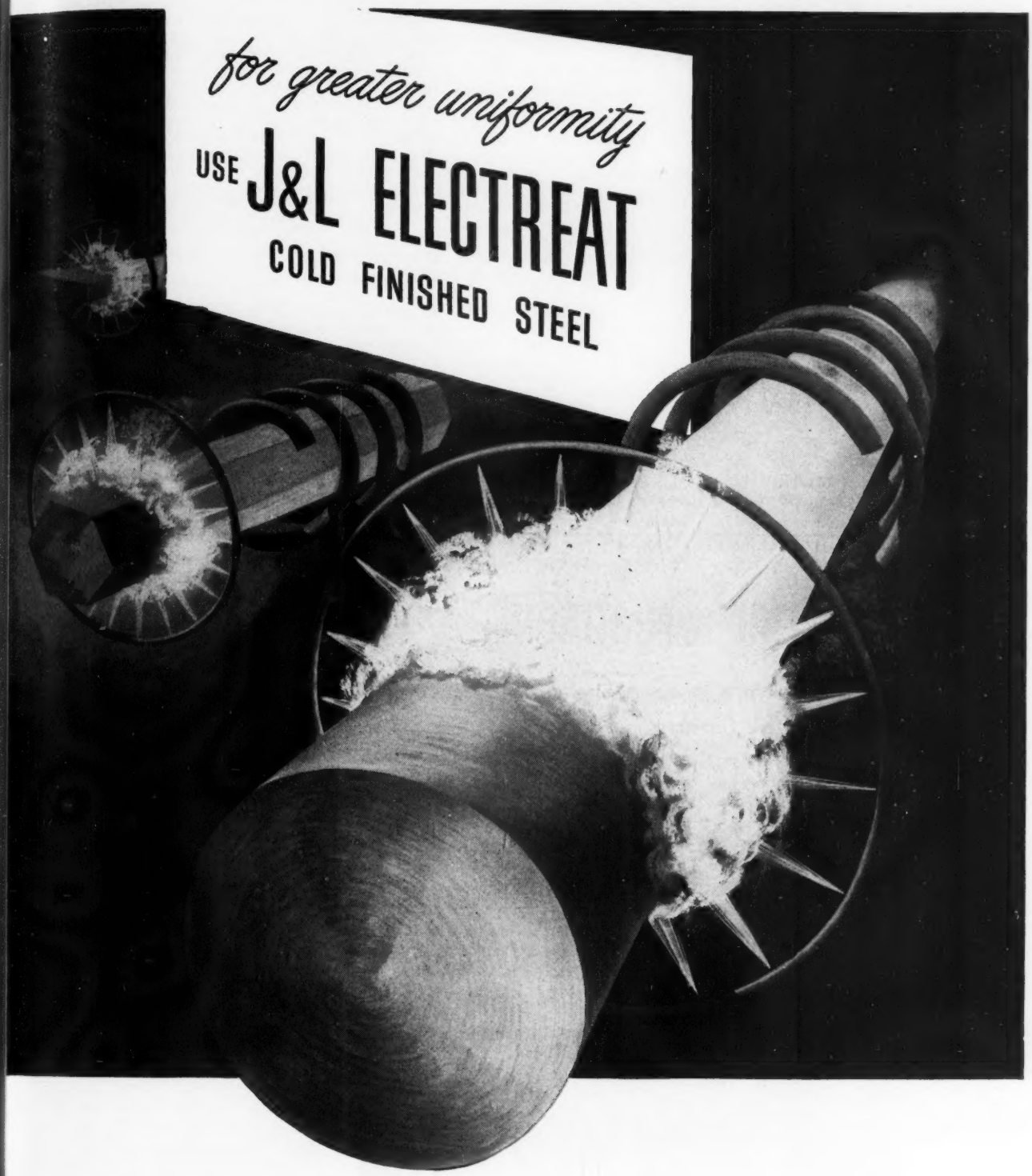
Element	Per cent
Chromium	28 to 32
Carbon	4.3
Manganese	1.5
Silicon	2.5
Sulphur	0.03
Phosphorus	0.08

The oxygen content in the air had been increased meanwhile to 55 per cent. The pressure was reduced to 13.54 pounds per square inch because of the lighter burden. The quantity of air blown through the tuyeres amounted to 56,403 cubic feet per hour and the temperature at the top of the furnace went down to 200 to 250 degrees Centigrade. The gas analysis was now as follows:

Gas	Per cent
CO_2	5.5
CO	59.0
O_2	0.6
H_2	0.5

The thermic value went up to 1900 calories. Coke consumption per ton of ferrochromium amounted to 4762 pounds. This does not appear to be the optimum considering that only 55 per cent oxygen in the air was used and 250 degrees Centigrade were measured at the top of the furnace. Slag tapped with the ferrochromium showed 17 CaO, 5 Fe and only 0.1 per cent Cr. The chromium, therefore, had been almost completely reduced.

The furnace produced ferrochromium for three weeks, then the end of the war interfered with further production. No difficulties with tu-



The new induction heating method of producing heat treated quenched and tempered cold finished steel makes possible an unusually accurate control of the process. Bars are fed individually through the coil and heated to exactly the desired temperature. They pass immediately through a cone of water sprays which is used to closely regulate the cooling. The Electreat cold finished bars produced by J&L with this process have a degree of uniformity not possible with conventional methods. Write for complete information.

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yeres, cooling arrangements, tapping etc., occurred during the whole period, in spite of the fact that the furnace had to be shut off many times for several hours due to air raids. The lining at the end of the campaign was worn little, as shown in Fig. 1.

From the foregoing, the low shaft furnace with oxygen-enriched blast shows the following advantages:

1. Temperatures can be reached which lie beyond those in normal blast furnaces (1800 degree Cent.) and which may theoretically go up to electric furnace temperatures of 3000 degrees Centigrade. It thus becomes possible to reduce metal oxides other than iron ore which require higher temperatures. Without preheating of the air the following temperatures can be reached theoretically:

% O_2	33	40	50	60
° Cent.	2400	2300	2680	3020

The greater number of tuyeres brings about a better distribution of this heat than the electrically produced heat concentrated around three electrodes.

2. Ores which could not be utilized because of the low content of metal may be smelted with oxygen-enriched blast, costs of which will be lower than the electric smelting costs.

3. Height of the furnace and the ensuing low weight of the burden makes it possible to use lower grade fuel like small coke or any noncoking coal or anthracite.

4. New designs of the furnace (rectangular shape) may allow for large production units in spite of low and narrow shafts.

5. Investment costs of the low shaft furnace are much lower than those of standard blast furnace plants. Erection costs of a furnace 20 feet high are substantially lower than those for a 100-foot furnace with all its cast iron construction, hoists, etc. No hot blast stoves are required.

6. Cost of hoisting the burden to 20 feet (low shaft furnace) is much lower than lifting it 100 feet (standard blast furnace).

7. Gases produced in the normal blast furnace are of poor thermic value and can only be burnt locally. Gases from a furnace with high percentage of oxygen in the air are of extremely high quality and may even be used finally as synthesis gas for ammonia production, etc. where carbon monoxide is required.

This article is from report PB-81385 which may be obtained for 75 cents from the Office of Technical Services, Department of Commerce, Washington 25, D. C.

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Practical procedures for salvaging cast iron, bronze, aluminum and malleable iron castings are set forth in an illustrated 2-page bulletin available from Eutectic Welding Alloys Corp., New York 13, N. Y. How to seal leaks and cracks, treatment of complicated light and heavy castings and the application of special alloy welding rods for application at low base metal heat are discussed.

Dual-Tempering Treatment

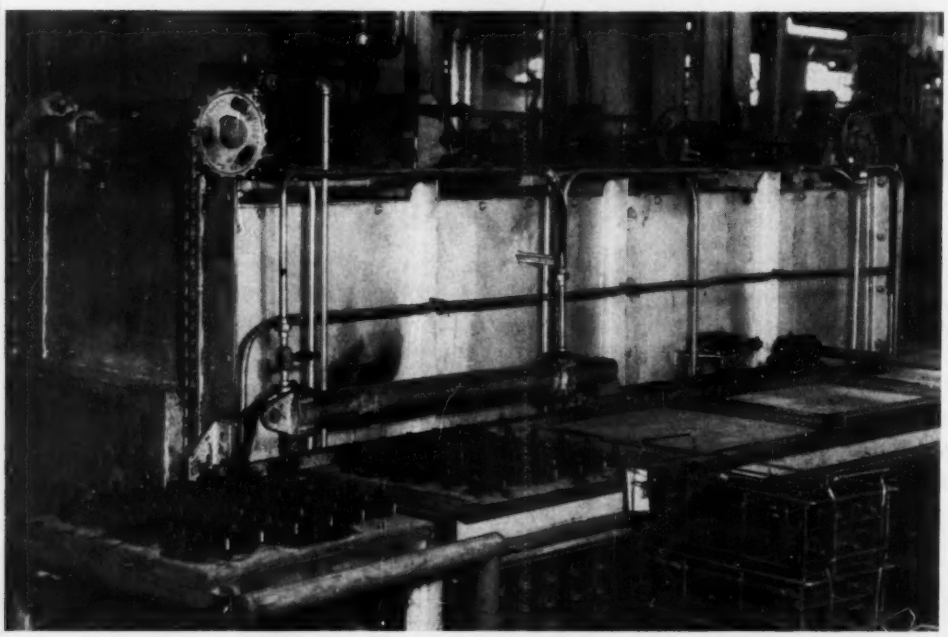
. . . accomplished in one operating cycle by continuous draw furnace

TEMPERING treatment which formerly required two separate operations is now accomplished in one operating cycle by a dual-temperature continuous draw furnace designed and constructed by Holcroft & Co., Detroit. Parts processed are SAE 5140 shafts with integral gears, machined from an upset forging and hardened to 57-61 rockwell C-scale. Specifications call for a gear hardness of 48-53 and a shaft hardness of 35-45 rockwell C after the draw. To prevent subsequent breakage in straightening, shafts must not exceed specified hardness.

These parts were formerly tempered in a pit-type convection furnace to the hardness specified for the gear, after which the shaft was immersed in a salt bath to bring this portion to the required lower hardness. The special Holcroft draw furnace shown in the accompanying photo now accomplishes both draws in a single processing, yielding considerable savings in production time and cost.

This unit has two horizontal chambers, separated by a row of insulated work trays and held at different temperatures. Hardened parts are loaded vertically in the trays as illustrated, with the gears above the top of the trays and the shafts projecting below the trays. Gears are heated to 475° F in the upper chamber of the furnace; shafts are heated simultaneously to 950° F in the lower chamber. Temperatures in the two chambers are controlled independently, and each chamber has forced circulation to assure uniform temperature throughout its length. Heat is supplied by a ribbon type removable electrical element in the lower chamber.

Trays are moved into and through the furnace by a hydraulic pusher under timer control, and are returned to loading position by gravity rolls and mechanical transfer. To prevent circulation between the two chambers, the furnace is kept filled with trays at all times, empty trays being covered with a steel plate to close the shaft holes. With 36 pieces per tray, a production of 110 pieces per hour is obtained.



Charge end of Holcraft dual-tempering furnace. Gears, at top of insulated trays, are heated to 475° F in upper chamber, while integral shafts are heated simultaneously to 950° F in lower chamber

Experiments with Explosives for

OPENING FURNACE TAP HOLES

Jet caster, a projectile-shaped tube containing 2-ounce charge of explosive, is on trial at Republic's furnaces. Action similar to bazooka. Blast furnace lining disintegration, carbon hearths, and top and bottom burning of tuyeres are widely discussed at Eastern States Pittsburgh meeting

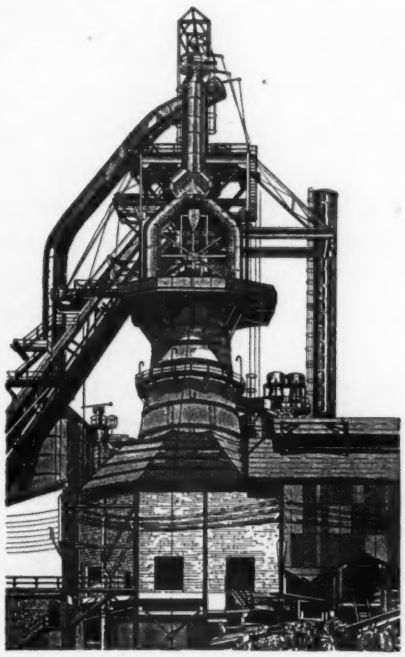
WHILE heavier loads are falling upon the shoulders of blast furnacemen today there is no letup in their willingness to produce. Plant after plant is dependent upon the blast furnace for pig iron which must flow freely down the runner into the ladles if steel is to be made. This was the keynote sounded by G. W. Hewitt, assistant vice president operations, Wheeling Steel Corp., Wheeling, W. Va., in opening the blast furnace session at the annual winter meeting of the Eastern States Blast Furnace and Coke Oven Association, William Penn Hotel, Pittsburgh, Feb. 6.

Conditions around blast furnaces are getting tougher and tougher, he asserted. Grades of ore and coke are becoming poorer and at the same time the blast furanceman with less and less to work with is asked to do more. He threw out a challenge for helpful interchange of ideas.

One of the most interesting experiments before blast furnacemen today is the use of the jet caster for opening iron notches. As explained by John R. Barnes, superintendent of blast furnaces, Republic Steel Corp., Cleveland, the iron notch is drilled out with a 2½-inch bit until the skull is encountered. After all dust has been blown out with compressed air, a projectile-shaped unit about 1 foot long and 2 inches diameter containing 2 ounces of an explosive is shoved into the notch and the charge exploded electrically. The action is similar to a bazooka. If one shell fails to bring the iron another is inserted and fired. The flow of iron is rapid and the stoppage at the end of the cast good.

At present only five jet casters have been used simply because they are something new and are not in mass production. Three of the five casters were used successfully; one failed to bring the iron because not all of the clay was drilled out of the hole, it is believed. It has been found that the hole must be fairly long for easy penetration. The caster is being modified for greater penetrating power. The unit also may be used for opening the tap hole of open-hearth furnaces.

The operation is so new that representatives of the company manufacturing the caster were not in a position to state the cost per unit but it is believed an iron notch using the caster can be opened for about $1 cheaper than by oxygen, computed merely upon the cost of the pipe and gas.



Plans are made to shoot 40 additional notches at Republic's blast furnaces and 10 tap holes at the open-hearth department. If successful, the manufacture will freeze the present design of jet caster and start on mass production; if not, further experiments will be conducted.

W. G. Trognitz, assistant superintendent of blast furnaces, Carnegie-Illinois Steel Corp., Youngstown, O., in speaking on "Economic Considerations for Stack Lining Repairs" cited the increased use of carbon hearths and the expectation that they will outlast ceramic hearths and even stack linings. Perhaps the life of stack linings will be predicated upon the ultimate life of carbon hearths by means of repairs to the lining, he stated.

Discussion of Mr. Trognitz's paper brought out the fact that disintegration of the lining of a blast furnace above the mantle indicates faulty distribution. To correct disintegration of lining the use of hard fired brick was recommended inasmuch as these bricks will keep pace with present-day improvement in hearths.

In the course of his paper, the author explained in detail the method employed in replacing the stack lining 25 feet above the mantle without disturbing the brickwork above. He pointed out that 24 pairs of knee braces were welded to the shell of the stack. Billets placed between each pair of braces were supported by cables running to the top of the furnace and around the periphery of the inwall. With the upper lining suspended by this means, all brickwork to the bottom of the shell was removed. The author mentioned that the method was employed not for the purpose of saving time but to adhere to a brick conservation program. Mr. Trognitz' paper will be presented in full in an early issue of STEEL.

In speaking on "Tapping Hole Design," W. S. Unger, blast furnace and coke oven engineer, Carnegie-Illinois Steel Corp., Pittsburgh, estimated that from 42 to 45 blast furnaces in this country have resorted to the use of carbon in hearth construction. Out of 54 stacks of his company 18 use carbon in some degree including three stacks each at Edgar Thomson, Carrie, Clairton, South Works, Gary, and two at Ohio and one at Isabella.

Operators discussing Mr. Unger's paper voiced the opinion that large carbon blocks are meeting with increased favor and they emphasized the future holds little promise for small hearth brick. It was brought out that carbon does not soften, it has strength and antiabrasive properties and is an ideal material for blast furnace hearths. One speaker submitted this provoking question: If 50 per cent of the blast furnaces in this country do not experience trouble with firebrick hearths is it not logical to assume that it is because they are not lined with carbon? Carbon linings will not make operation foolproof if you do not use sense, he stated.

Furnacemen were in full agreement in this respect: Carbon hearth lining will more than pay for itself if it obviates the formation of salamanders and the resultant use of dynamite in their removal.

T. J. Wells, superintendent, blast

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Improved deliveries on special types and larger ratings will be the subject of future announcements, as quickly as increased output makes them possible. Watch for them . . . phone your orders from this stock list to your nearest Westinghouse representative. Westinghouse Electric Corp., Box 868, Pittsburgh, Pa.

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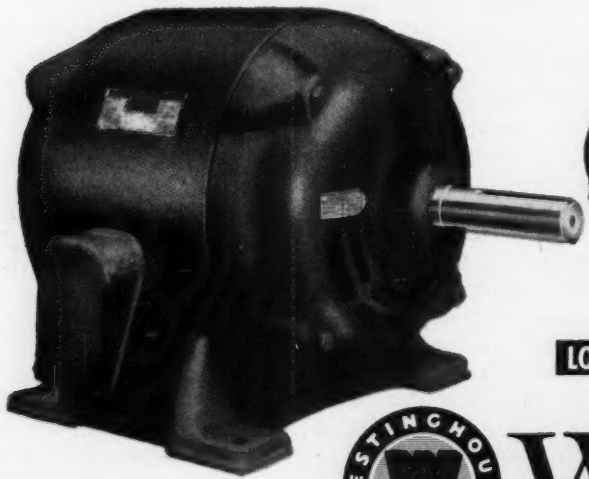

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"Near-standard" motors are those with minor modifications, which include such items as double shaft extensions, NEMA standard B and C flanges, special No. 1 insulation, round frame, conduit box opposite standard, squeeze connectors instead of conduit box, TENV motors, partial motors, 50-cycle, 40° C. rise open motors, etc.

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HP	RPM	FRAME	VOLTS	IN STOCK
1	1750	203	220	✓
1½	1750	204	220	✓
2	1750	224	220	✓
3	1750	225	220	✓

Life-Line A-C, 3-Phase, 60-Cycle, Squirrel-Cage Motors

HP	RPM	Frame	Volts	ENCLOSURE TYPES IN STOCK		
				Drip-Proof	Splash-Proof	Totally Enclosed
½	860	204	220/440	✓		✓
¾	1150	203	220/440	✓		✓
	1150	203	550	✓		✓
	850	224	220/440	✓		✓
1	1750	203	220/440	✓		✓
	1150	204	220/440	✓		✓
	850	225	220/440	✓		
	850	225	550	✓		
1½	3450	203	220/440	✓	✓	
	1750	204	220/440	✓		✓
	1150	224	220/440	✓		✓
	860	254	220/440	✓		
2	3450	204	220/440	✓		
	3450	204	550	✓		
	1750	224	220/440	✓	✓	✓
	1750	225	220/440			✓
	1150	225	220/440	✓	✓	✓
	860	254	220/440	✓		✓
	860	254	550	✓		
	710	284	550	✓		
3	3450	224	220/440	✓		
	3450	224	550	✓		
	1750	225	220/440	✓	✓	✓
	1750	225	550			✓
	1135	254	220/440	✓	✓	✓
	875	284	220/440	✓		
5	3450	225	220/440	✓	✓	
	1735	254	220/440	✓	✓	✓
	1735	254	550	✓		
	1200	284	220/440	✓	✓	✓
	875	324	220/440	✓		
7½	3470	254	220/440	✓		
	1740	284	220/440	✓	✓	✓
	1740	284	550	✓		✓
	1160	324	220/440	✓		
	865	326	220/440	✓		
10	3500	284	220/440	✓	✓	
	1740	324	220/440	✓		✓
	1740	324	550			✓
	1155	326	220/440	✓	✓	
	870	364	220/440	✓		
15	3500	324	220/440	✓		
	1750	326	220/440	✓	✓	
	1160	364	220/440	✓		
	1160	364	550	✓		
	875	404	220/440		✓	

Subject to prior sale.

Life-Line motors

MORE PRODUCTIVE POWER FOR INDUSTRY

furnaces, Republic Steel Corp., Youngstown, O., who spoke on "Maintenance of High-Pressure Furnaces", drew attention to the fact that a 1-piece hopper is a necessity if cutting action is to be avoided. He told how a water-cooled plastic material was installed against which the big bell was seated; it failed in 24 hours. At present, bells and hopper are being hard surfaced and no visible wear is apparent, he stated.

Top burning of tuyeres usually are a result of poor stock distribution, stated A. M. Baker, superintendent, blast furnaces, Weirton Steel Co., Weirton, W. Va., in speaking on "Tuyere Burning Antidotes". A hopper incorrectly designed, or a bell off-center, or scabs on the inwall also will cause excessive burning of tuyeres. Sometimes a change in the filling arrangement will serve as a remedy, he said.

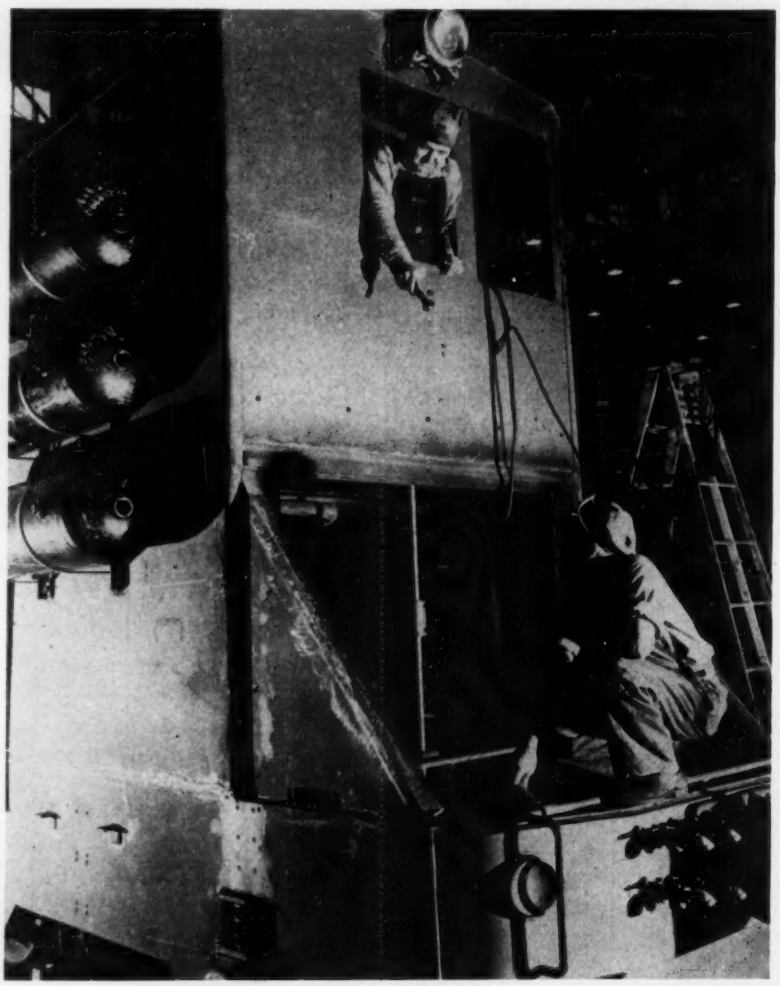
The speaker cited one furnace burdened on foundry iron which lost 134 tuyeres in one month, the stack was swung over on basic iron and the tuyere loss fell to only 13 per month. He explained that two grades of ore were used—one self-fluxing and the other highly silicious with the result that too high a by-slag was produced which reacted in a high tuyere loss.

While pig iron has no effect on the burning of tuyeres, yet tuyere loss is hard to combat, the speaker contended. If hearth walls are kept free from buildups, slag and iron will not get to the bottom of the tuyeres. A large percentage of nut coke and slag high in lime will cause buildups.

Practice shows that whenever good coke is used and a lean slag is maintained, tuyere burning is a rarity. On one stack the tuyere loss was reduced from 33 to nine merely by running the furnace on a leaner slag and increasing the slag volume by 150 pounds. Another means often employed to reduce tuyere loss is to charge a coke blank of 60,000 to 70,000 pounds once a week.

Discussion developed the following points. The water well at the end of the tuyere should not be restricted; it should be maintained at least 2 inches from the nose. Emphasis was laid on the fact that water pressure does not influence tuyere burning; from 30 to 35 pounds per square inch usually is employed. Furnacemen were cautioned not to use hot-well water for tuyere cooling; river water gives better life. Tuyere burning was attributed largely to small coke by one operator who favored the use of heavy nose tuyeres.

Tuyere loss on high-pressure furnace operation frequently runs as high as 90 to 94 per month. Tuyeres last as long as 10 minutes in operation; others a couple of days, and others still longer—all burning on the bottom, and all types being involved. Reasons for this loss, as voiced by various operators, was either the use of fine coke or that this type of operation runs a different tuyere zone.



NO STREAMLINER: Designated as a "giraffe" in the locomotive family by its maker, General Electric Co., this unusual locomotive is being built in the company's Erie, Pa., locomotive shops for coke-quenching car service. The 20-ton, 2-axle, 250-volt electric locomotive is about 15 ft high and only 20 ft long. It is rated at 10,000 lb starting tractive effort and has a top speed of 7.5 mph

New Brass Forging Lubricant Developed

Better parting, cleaner and sharper forging, improved surface finish and longer die life are advantages claimed for a recently developed die lubricant used for press forging brass. Developed by Acheson Colloids Corp., Port Huron, Mich., for a fabricator of brass shapes, the lubricant is a dispersion of semicolloidal graphite supplied in concentrated form that is added to another fluid.

Intricate shapes reportedly are formed in perfect detail using the lubricant. Where the formerly used lubricant resulted in rounded corners on gear teeth, the new lube left all corners of the teeth sharp, indicating free flow of the metal to all parts of the die, the company stated.

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Two gasification processes considered to be promising for manufacturing gas for the Fischer-Tropsch synthesis are described in a technical report for sale by Office of Technical Services, Department of Commerce, Washington, D. C. Included in the report, No. PB-80330, are a description and illustrations of the Thyssen-Galocsy process, the Lurgi high pressure process and a brief review of the Koppers carbonization-gasification process. A summary of the Fischer-Tropsch liquid fuel synthesis is included.

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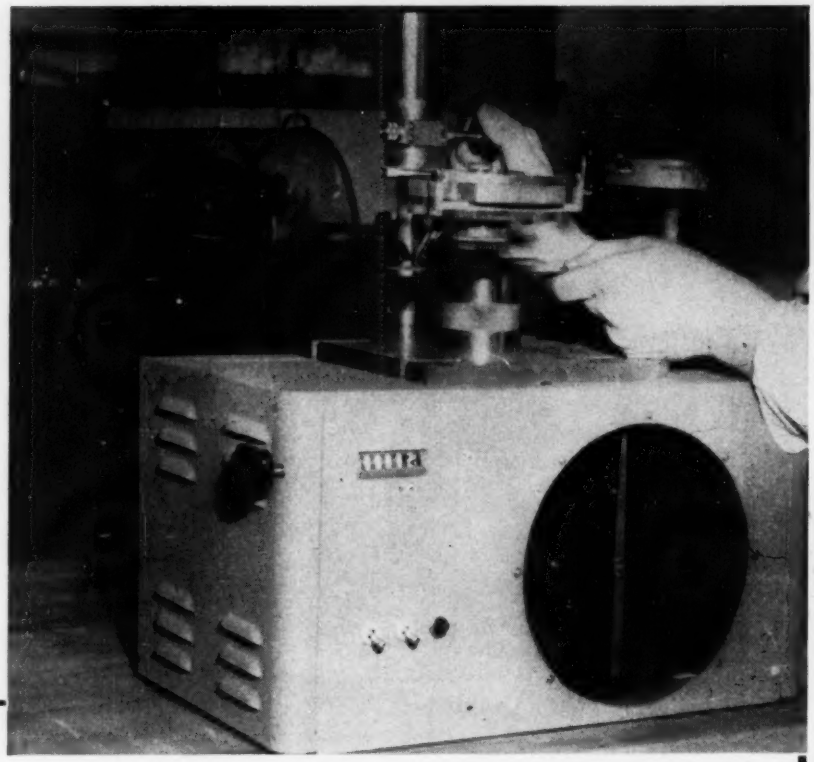

Adherence of Porcelain Enamel

. . . to base metal measured by new testing apparatus using magnetic counting principle

REVOLUTIONARY new testing apparatus for measuring the adherence of porcelain enamel to base metal by means of magnetic counting was recently developed by the research foundation of the Porcelain Enamel Institute in the National Bureau of Standards, Washington.

New instrument was primarily designed to supplement the conventional fracture test for adherence and provide more complete data on the impact characteristics of porcelain enamels. Test was recently described at the Porcelain Enamel Institute forum in Columbus, O., by A. C. Francisco, PEI research fellow at the Bureau of Standards.

As shown in the accompanying illustration, tester unit is assembled in one piece, consisting of test head, stand and specimen holder mounted on the control cabinet which contains power supply, selector switch and magnetic counter. Test head is molded plastic and contains 169 spring-actuated steel probes, individually connected to respective segments of the selector switch. Mass of probes, similar in appearance to the face of a fine wire brush, is arranged in a hexagonal pattern, 0.10-inch on centers.

In operation, a ground wire is attached to the specimen to be tested and the test head lowered onto the test surface, spring-actuated probes adjusting to the contour of the test area. A synchronous motor actuates the selector switch and each circuit, in turn, is automatically tested. If a given probe comes in contact with exposed metal, a relay activates the magnetic counter, thus recording the attraction of that particular probe to the surface. Computation of the adherence of the test area as a whole is easily carried out by determining the number of probes affected and degree to which they are affected.

In addition to computing the numbers of probes contacting bare metal, analysis of the patterns of exposed metal indicates how porcelain enamel, in a multitude of thicknesses and compositions, reacts to varying degrees of impact.

Thermal Capacity Vital In Contact Materials

Silver may actually be inferior to other materials for certain electrical equipment applications, even though it is one of the most widely used contact materials. This fact was brought out by B. W. Jones of General Electric Co.'s Control Division, Schenectady, N. Y., in a speech before a colloquium at Massachusetts Institute of Technology, Cambridge, Mass., in which he described investigations into the factors involved in contact-material selection and application.

Most important factors in contact materials are thermal capacity and oxidation, he stated, pointing out that silver possesses the former characteristic in a relatively low degree. The resultant tendency to vaporize and explode when interrupting large currents may overshadow the superior life possibilities seemingly inherent in silver because of its low oxidation rate.

Oxidation is the important factor to consider when the contact materials will be used to make and break a moderate amount of power a large number of times, Mr. Jones asserted. Thermal capacity is the factor that to a very large degree determines the life of contacts used for making and breaking a very large amount of power a few times.

Bearing Load Carrying Capacity Increased 25%

Results of an exhaustive 10-year study in the physical laboratory of the Timken Roller Bearing Co., Canton, O., and in the field have made possible a 25 per cent increase in the radial and thrust load carrying capacities of the company's complete line of tapered rolled bearings.

This increase reportedly is based on several factors, including improved alloy steels made specifically for antifriction bearings, better metallurgical control, more accurate manufacturing equipment, improved surface finishes and more accurate inspection methods.

According to the engineers of the company, the increase in capacity ratings will enable design engineers to effect important savings in new designs, not only in bearing costs but in surrounding mechanisms as well.

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A 28-page booklet, "Tips on Spring Service and Inspection," is being offered by Leaf Spring Institute, Detroit 2, Mich. Written by Murray Fahnestock of that organization, the booklet is the outgrowth of an Interstate Commerce Commission request for practical instructions on inspecting of springs.

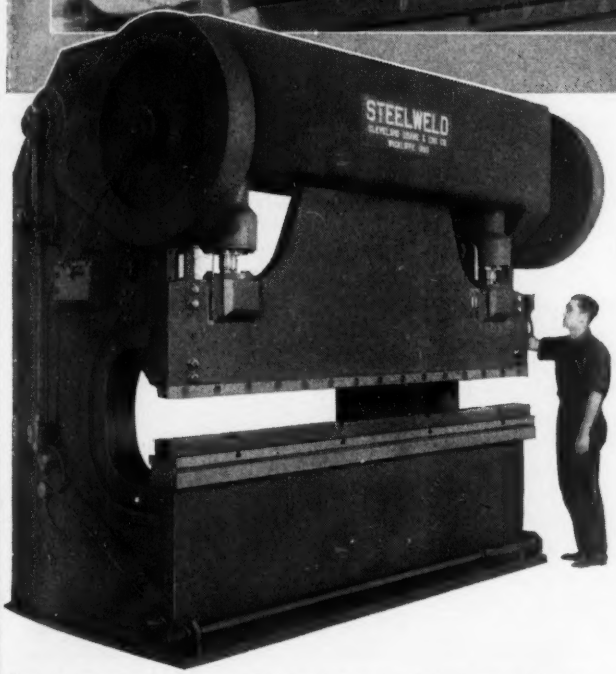

Photo at top shows Cleveland Steelweld Press forming motor housing top. Only one of many varied operations performed on this machine.

SMOOTH CURVES WITH STANDARD DIES

Smooth curves are readily formed with standard or simple dies on a Cleveland Steelweld. This is only one of the many kinds of work being performed on hundreds of these versatile presses every day.

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Drawing Tubular Parts—*Continued from Page 84*

investigation the draw stress was found generally to conform approximately to the hardness of the specimen.

Effects of "die contour" are known from various publications. The stress required to draw tube, by any method, increases with decreasing die taper, Fig. 4. This relation can be generalized, stating that the draw force should increase with increasing length of the contact surface between metal and die, other conditions being identical. As an approximate inverse measure of this contact length, the angle between the axis and the chord drawn between the points of contact at the entrance and exit, respectively, can be taken. This angle may be termed "effective angle", Fig. 4. For a true tapered die, this effective angle is identical with the half-die angle. For a bell-shaped die, the effective angle increases with the reduction. If this effective die angle is used as variable, the draw force is found to be a function of this angle (for a given reduction) and practically independent of the die contour, Fig. 4.

However, presence of a cylindrical section at the exit, called land or die bearing, increases the draw stress in proportion to its length. This land is rather short in conventional dies, and its contribution is therefore considered immaterial.

The "die material" also did not noticeably influence the draw force, Fig. 5. Experimental data obtained with cemented carbide dies, chromium-plated steel dies, and graphitized steel dies were within the limits of experimental error, identical to those obtained with the common hardened (high-carbon) tool-steel dies of equal contour. This result does not agree with those obtained in previous investigations. The friction coefficients for cemented-carbide dies were usually found to be lower than those for steel dies. However, the friction coefficients for steel dies under conditions similar to those used in the present investigation were found to be exceptionally low. It appears therefore that the die (surface) material influences the draw forces to a significant extent only if the lubricant used does not reduce the coefficient of friction to a small value, and possibly also if the die is worn.

"Punch contour" did not materially affect the draw stress. Curves representing the draw force as a function of the reduction were almost identical, if a tapered punch or if cylindrical punches were used in combination with tapered dies having large angles (12.5 and 27.5 degrees). However, with decreasing die angles, the curves obtained with tapered punches deviated increasingly to higher values from the curves obtained with cylindrical punches.

This may readily be explained by the decrease of the actual working angle by an angle equal to the taper of the punch (0.9-degree half-angle), the effect of this being appreciable only for the small die angles where the draw stress is sensitive to variations in die angle.

No influence of "punch material" could be detected. Tapered punches of steel and of chromium-plated steel yielded practically identical force-stroke curves for either smooth punches or for rough punches.

"Punch surface" had only a slight effect on the draw stress, up to reductions of 50 per cent. With further increasing reductions, however, the draw stress using a rough-ground punch became increasingly greater than that using a polished punch. No appreciable differences in draw stress could be observed for punches polished with 4/0 emery polishing paper and punches with a Chrysler superfinish. The magnified outlines of these three surfaces are shown in Fig. 6.

To investigate the effects of lubricants, a large number of specimens was subjected to high reductions. In addition to measurements of the draw force, the breakage was determined and the specimens were inspected for scoring. The lubricants investigated comprised a number of specially prepared drawing compounds and, in addition, castor oil, tallow, aqueous soap solutions of various concentrations with and without additions of stearin or lard oil. The results of some of the tests are assembled in Tables I and II.

Of the commercial lubricants investigated, none excelled the lubricating action of soap solution. This was observed particularly in the preparation of the drawpieces, involving several draws in the hard condition, Table I. Only one of the proprietary lubricants (No. 1) which, significantly, also had a soap base, yielded approximately the low draw force of soap solution; and various water-soluble lubricants required 5 to 10 per cent higher draw forces than did soap solution.

Castor oil in combination with annealed drawpieces and polished dies (any material) yielded slightly lower draw forces than when immersed for a short time in soap solution (5 to 15 minutes), Tables I and II and Fig. 6. However, any condition deviating from optimum resulted in fouling of the tools, this causing considerable increase in the draw forces. The drawing of hard brass caused particularly heavy fouling of the die, scoring of the brass, high draw forces, and breakage, see Table I.

The lubricant used as standard throughout these tests was a 2 per cent aqueous soap solution (chip soap) which is rather widely employed in the deep-drawing of cartridge cases. As the investigation progressed, a considerable portion of

TABLE I

EFFECT OF VARIOUS LUBICANTS ON DRAW FORCES IN TWO DRAWS OF A TANDEM DRAW ON HARD-DRAWN CUP*

Lubricant	Number of test	Average draw force, lb — 0.705-in. die	Average draw force, lb — 0.610-in. die	Remarks
Standard soap solution:				
5-10 min immersion	61	4,150	9,160	Satisfactory
2 hr immersion	25	3,835	8,850	Satisfactory
Castor oil	5	5,160	10,440	100 per cent breakage
Commercial lubricants:†				
No. 1 soap, oil, high-pressure lubricant	36	4,000	9,105	Satisfactory
No. 2 animal fat, emulsifying agent	14	4,550	9,750	Scoring and high breakage
No 3 palm-oil base	25	4,450	9,530	Scoring
No. 4 (unknown composition)	10	4,580	9,650	Scoring
No. 5 animal and vegetable fats	6	5,080	9,600	Satisfactory
Standard soap solution plus 0.1 per cent stearin (10 sec immersion)	14	3,980	9,170	Satisfactory
Dry stearin (applied in ether)	10	4,220	9,560	Satisfactory
Dry stearin surface plus normal soap solution (10 sec immersion)	10	4,100	9,360	Satisfactory

* Hard cups 0.763-in. OD x 0.102-in. wall thickness drawn in preparation of standard drawpieces to drawpiece 0.613-in. OD x 0.049-in. wall thickness through two dies in tandem, the dies being 0.705-in. and 0.610-in. diam. (Individual reductions equal 31 and 40 per cent; total reduction equals 58.5 per cent).

† Dilutions were as recommended and varied between ratios of 1 to 6 and 1 to 4 parts lubricant to water.

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Scientific Materials Handling described in 44 page booklet. Ask for copy of "Industrial Logistics".

due to longer, more varied experience serving over 300 branches of industry. The nearest EP man will gladly discuss your truck requirements. The Elwell-Parker Electric Company, 4501 St. Clair Ave., Cleveland 14, O.

TABLE II

EFFECT OF DIE CONDITION AND VARIOUS LUBRICANTS ON DRAWING ANNEALED DRAWPIECES*

Lubricant	Highly polished die			Worn die		
	No. of tests	Average draw force, lb	Breakage, per cent	No. of tests	Average draw force, lb	Breakage, per cent
Standard soap solution:						
5-15 min immersion	350	3,600	13	25	3,660	12
24 hr immersion, plus 1.5 per cent lard oil	10	3,210	20	15	3,280	0
Castor oil	23	3,410	0	10	3,920	70
Tallow	7	3,630	43			

* Annealed drawpieces 0.613-in. OD x 0.049-in. wall thickness drawn to 0.558-in. OD x 0.020-in. wall thickness (61 per cent reduction).

the scatter of the draw forces was traced to the short time of immersion in the lubricant, being usually between 1 and 15 minutes. A study of the effect of time of immersion of the specimens in soap solution yielded a decrease in draw force by approximately 5 per cent if immersed in the lubricant for at least 20 minutes. It is believed that this improvement in the lubricating action of soap solution is caused by the formation of a film of stearate which adheres to the metal surface. This film could be partially removed by rubbing the drawpiece with the hand or washing it in water prior to drawing, these procedures resulting in an increase in draw force. No differences were observed between the draw force obtained with freshly made and with aged soap solutions. A few tests on the effect of soap concentrations showed noticeably decreased draw forces if the concentration was less than ¼ per cent.

Additions of stearin, Table I, or lard oil, Table II, to a 2 per cent soap solution resulted in insignificant changes in draw force. It appears, however, that they stabilize the soap solution, greatly decreasing the time of immersion required to obtain consistent (and low) draw forces. A dry stearin coating on the test pieces, obtained by dipping them in a solution of stearin in ether, also gave approximately the same performance as the soap solution, Table I.

From data presented before annual meeting of American Society of Mechanical Engineers, Atlantic City, N. J., Dec. 2-5, 1947.

Aluminum Pigments Made To Inhibit Rot, Mold

Ability to inhibit fungicidal growth, infestation by wood eating insects and the growth of mold has been imparted to aluminum pigments, according to Reynolds Metals Co., Louisville, Ky. The new process, termed Reynolized, is said to result in an aluminum paint having all inherent preservative qualities plus the ability to render wood and other surfaces passive to the effects of mold, rot and other forms of fungi activity, along with resistance to termites, carpenter ants and other chewing and boring insects.

The company sees wide use of the process in storage warehouses, maintenance of buildings and fences, in structural lumber and in the foundations and structures of wooden bridges. Its use is said not to be confined to wood surfaces, paper and fabric surfaces being made to reflect more heat and resist rot and mold at the same time.

Copper Electric Wire Annealed in Steam

A process whereby copper electric wire was annealed in partial steam is reported to have saved floor space, required lower processing buildings and facilitated crane handling for its originators, the Germans, according to a report issued by the Office of Technical Services, Washington. The report, No. 75831, is based on observation and investigation of 10 leading producers and is a general survey of practices used in the manufacture of the principal types of cable and wire in that country.

For annealing in partial steam, the coils of wire are stacked on a base suspended in a pot. After the charge is lowered into the pot, about 1 liter of water is poured in and the head is bolted down to it and made air tight. The whole unit is lowered into an electric furnace. Annealing temperatures of 250 to 420°C are used. During the cooling period the pots are filled with producer gas generated from brown coal briquets.

Another method of annealing in steam, the "wet process," annealing in charcoal and in town gas are described, along with annealing methods for aluminum. Balance of report considers natural and synthetic rubber core insulation and sheathing materials, lead coverings, description of cable making processes, etc.

New Design May Boom Railroad Electrification

More widespread adoption of railroad electrification—acknowledged to be the best means yet devised for the operation of a railroad—is foreseen in the development of a radically new idea in locomotive design proposed by Westinghouse Electric Corp. transportation engineers. Formulated by W. A. Brecht and Charles Kerr of that company, the proposal centers around a "packaged" electric locomotive which could be constructed for either switching, passenger or heavy freight service by putting together identical power units in "building block" style.

Making their presentation before the midwinter convention of the American Institute of Electrical Engineers, the engineers said, "Complete standardization of mechanical and electric parts would make this type of locomotive the cheapest to build and operate and the most powerful for its weight of any other now on the rails."

Key unit in their proposed "building block design" is a four-wheeled truck carrying two electric motors of 469 horsepower apiece. For the smallest type of locomotive, generally used in switching service, a single cab would fit over two such trucks. For larger locomotives "we would increase the number of trucks and lengthen the cab until we reached a 16-axle locomotive with a maximum rail horsepower of 10,000," they stated. Other electrical equipment could be similarly "packaged" and standardized in proposed new design.

—o—

Compression type fittings may be adapted to thermometer bulbs by a new method developed by Manning, Maxwell & Moore Inc., Bridgeport, Conn., reportedly enabling users to change thermometers originally made with plain bulbs to union connection. Compression fittings are applied directly to the bulb to produce any desired length up to 6 inches. It is stated that with this new method, users may keep thermometers available and install them wherever necessary by applying the compression fittings.

hydraulic ⅜-inch press is used to form peculiar radii and for the embossing of the radiator guards.

Large Pattern Shop—The pattern shop, three floors, 20,000 pattern storage, 80 feet square, fireproof, averages 400 patterns in daily movement. There are five pattern makers, one handyman, a foreman. The company has its own system of gating and heading which has proved very successful. Scrap has averaged 0.05 per cent in the last 12 years. Patterns must be mounted on boards with gates and heads mounted and attached. From the pattern on, work is kept orderly and all phases of the foundry practice are clean.

Omsteel has a complete laboratory for which two test bars are poured each heat, a unique test mold having been developed that saves much metal waste. Another test bar is poured between heats, after ten molds have been poured. Castings weigh from ½ to 12,000 pounds. The foundry is pouring 40,000 to 50,000 pounds per day now, would like to pour 80,000 pounds but help is hard to get.

Outstanding things have been done in casting machine components for Omsteel's own use, unable to get outside equipment in time. One breakdown, which outside suppliers could not deliver parts to repair for a year caused the foundry superintendent to make the pattern, cast and machine a 110-inch gear wheel, 8-inch face, 147 teeth, in 20 days' time. Needing a straightener press in the cleaning department, outside suppliers estimated $45,000 cost and 2-year delivery. So a 15,000-pound cylinder, 2 heads, pistons, were patterned, cast, machined; beams and plate for a 4 by 12-foot by 8-inch bed size were purchased, and a 400-ton hydraulic press was built in four months.

Unusual Charging Buckets—Charging buckets have an unusual dump feature. Previously, as is somewhat general practice, bucket bottom doors were closed and held by manila rope which would burn out with the charge over the furnace, releasing the doors to dump. But the method had hazard and delay. So tubing was welded two-thirds down inside the bucket wall. A lug was welded on the bucket with an eye to which the cable was hooked, accommodated by a lever and pin. Pulling out the pin actuated a lever which in turn controlled the cable which released a master door that controlled the eight orange-peel doors folded at the bucket's bottom. This feature is said to be worth thousands of dollars in charging practice.

There are safety guards around the weighing scales, chains around the pouring pit, thorough guarding of the pouring wheel to protect the furnace man who goes into the pit to pick up the heat. A bridge rides on a rail over the pouring pit.

A store room aloft over foundry bay is amply stocked with brooms, chills, chaplets, scoops, flask bottles, sprinkling cans, lights. Chills are made and spot welded 10 at a time. Tops are ground to prevent blow holes and the chill is covered end and ground. Omsteel never gets caught short of accessory supplies or of even the most minor of foundry stores. This tendency to anticipiate trouble has saved a lot of foundry time.

Charging floor is at ground level, south entrance, accommodated by narrow gage rail upon which the charging buckets travel on a dolly. Castings are of chrome - nickel, chrome-vanadium, and other alloys as well as high and low carbon, tensiles up to 120,000 pounds per square inch. Omsteel gets sufficient local scrap.

Charging buckets are 10,000-pound capacity. Typical charge is 10 per cent gates and heads, 80 per cent local miscellaneous scrap, 10 per cent own scrap from structural trimmings. Submerged drums at the end of the charging floor, driven by ½-horsepower motors, pulls the buckets by cable from loading to the weighing and charging positions. Travel to the furnace is 20 feet.

Omsteel uses a 15,000-pound Electromelt 13,200-volt incoming, capacity 8000-pound furnace. The melt is on a 1 hour 35 minute heat cycle. Shifts from 7 to 5 p.m. get five to six heats per day, have gotten as many as nine.

There is a 5-minute interval between heats, unusually fast. Omsteel

REDUCES CASTING DEFECTS: Banks of 250-watt infrared lamps—248 in all—are used now to dry molds and melt out 98 per cent of the wax pattern in precision "lost-wax" casting foundry of Westinghouse Electric Corp., East Pittsburgh, Pa. Balance of wax is burned out in preheat furnace where molds are heated to 1000° C for casting. Infrared process shown above is found to reduce mold cracking and eliminate many defective castings in making gas turbine blades and other intricate or hard to machine parts

new Bullard type "K" economies widen scope of MULT-AU-MATIC metho

HIGHER SPEEDS, FASTER INDEXING, EASIER CHUCKING REDUCE TIME ON AND BETWEEN CUTS

Demand for a BULLARD Mult-Au-Matic capable of lowering production costs of small and medium sized jobs in cast iron, steel and light metal alloys such as aluminum and magnesium is now met by the addition of the new Type "K" to this versatile line of cost-saving machines.

Higher Speeds Meet New Job Requirements. Providing spindle speeds up to 900 rpm, the new Type "K" gets full productive capacity out of modern cutting tools. The wide range of available spindle speeds makes it adaptable for machining many different kinds of materials in sizes within its chucking capacity.

Saves Time Between Cuts. A newly developed index control mechanism permits faster return and advance of tool carrying heads and faster carrier index, materially reducing lost time between cuts.

Higher Degree of Accuracy. New method of carrier index registry insures maintenance of repetitive accuracy from station to station. This results in producing work to close tolerances in keeping with present-day requirements.

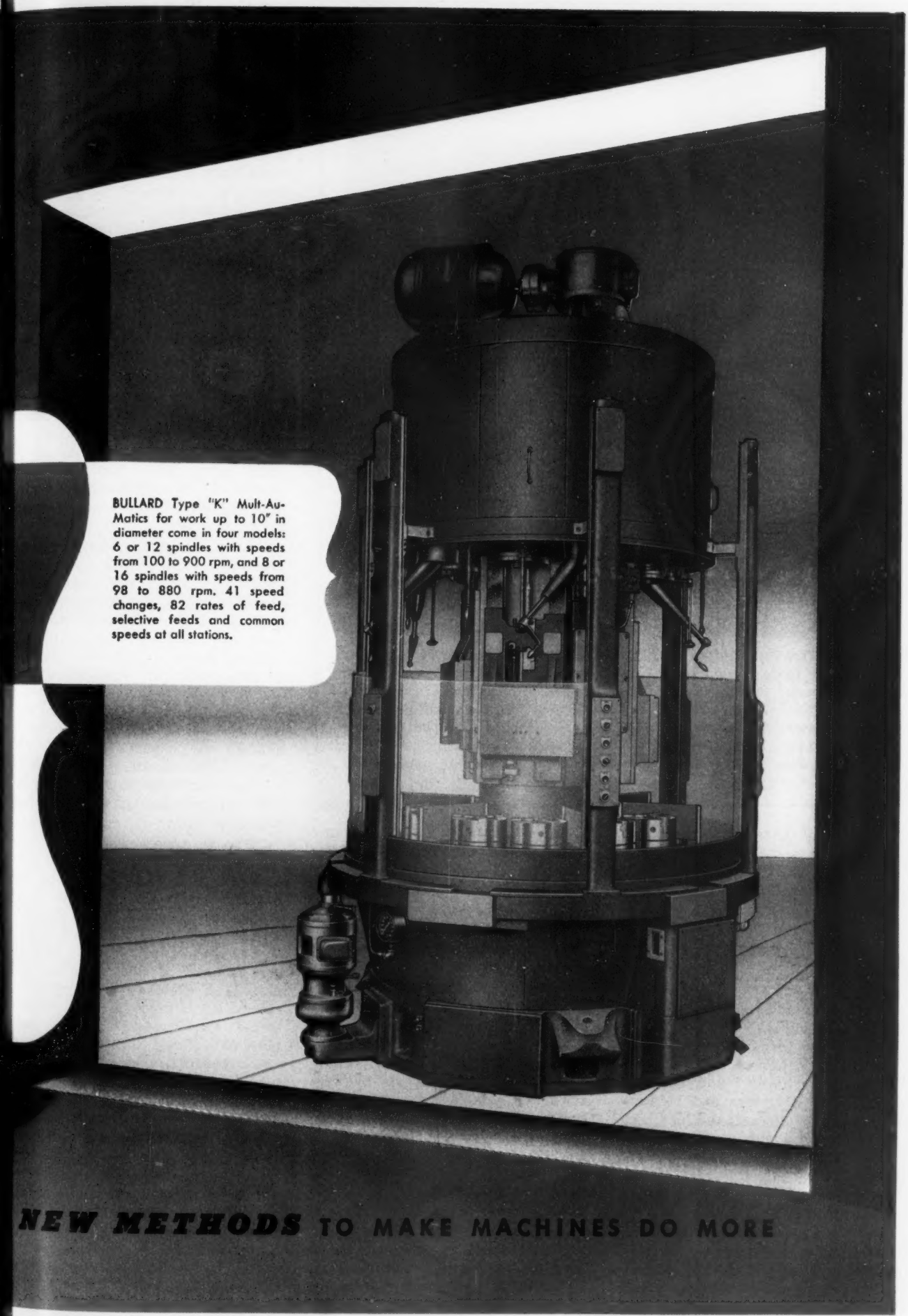
Improved Hydraulic Chucking Increases Efficiency. Work is chucked quickly by means of a foot treadle control and is automatically released when spindles are returned to loading station. Chucking pressure may be regulated to suit work characteristics.

Twin Spindles Double Production. To the four economies just described, common to all *four* Type "K" models, the twin-spindle models add the extra advantage of delivering two finished pieces for every index cycle. This promise of lower production cost is worth investigating further.

Many other advantages are inherent in the new Type "K" version of the Mult-Au-Matic method, one of the leading contributors to our modern American production system. Write for complete information. THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD

CREATES



BULLARD Type "K" Mult-Au-Matics for work up to 10" in diameter come in four models: 6 or 12 spindles with speeds from 100 to 900 rpm, and 8 or 16 spindles with speeds from 98 to 880 rpm. 41 speed changes, 82 rates of feed, selective feeds and common speeds at all stations.

NEW METHODS TO MAKE MACHINES DO MORE

PROTECTS PRECISION PARTS: Three rubber covers to protect high precision parts from abrasive dust are features of this new contour wheel dresser invented by Nils Hoglund, Union, N. J. Two of the covers are flexible corrugated tubes slipped over template slide and piston rod mechanism. Other piece is a flexible neoprene hood to shield bearings directly under grinding wheel. Covers, developed by United States Rubber Co., New York, prolong life of dresser and eliminate unnecessary cleaning practices

does no hand charging. The furnace does not tip to charge. Furnace head swings out and the charge is made by bucket directly into the furnace. Usual capacity is increased by melting down the first charge and recharging.

Pouring Practice — Pouring ladles are 10,000 to 20,000-pound capacity; the shop maintains ten. Foundry floor is 450 feet long with a 65-foot center bay and two 55-foot side bays. At the south end, furnace and scales are located side by side. At the weighing station, alloy bins and separate scales are maintained, the bins containing ferromanganese, ferrochrome, pig iron, nickel, aluminum, and other materials.

Large castings are poured in the left bay. The center floor is given over to machine-mold pouring. Here, cables are laid on the floor to align molds so that pouring can be accurate, much time and metal saved. The right bay contains the core and machine molding operations. An elaborate sand cleaning and mixing equipment setup, accomplished by National Engineering Inc., and with some Omsteel suggestions, occupies the back of the foundry floor. Overhead belt conveyors transport sand from the molding machine or from the bench.

Ottawa silica sands are washed and dried before use. In recovery, there is conveyor progression from shake-out to separator to barrel roller to separator to hopper 100 feet aloft. All metal and sand are recovered and re-used. In the old foundry setup, the company used 1 ton of new sand per ton of castings produced. In the new setup only 800 pounds of new sand are used for the same production output.

An unusual rigging on the pouring ladles consists of a three-part slide to keep straight up-and-down on open-close pouring practice, rather than the typical male-female two-part slide. This assures greater accuracy and metal saving. All steel flasks are used. The pour is by overhead crane, bottom pour.

On a 10,000-pound kettle, the company gets 80 per cent yield. Average yield is continuously around 65 per cent, unusually high. The sectional flask was embedded 6 feet to get crane room for the 10-ton Whiting. Pour was interrupted to pour test bars. These are 50-pound bars and the mold design pours from the lift, chases gases and traps away through the other port, eliminating all test bar trouble. After the kettle flask pour is completed, 200 pounds of metal is poured in the head to assure a solid casting, being later torched off.

In machine-mold pour, to assure clean casting, a pouring cup is used for each mold, rather than just sand. These are of sand and clay, 6 per cent moisture, baked at a cost of 6 cents each. Some 300 molds per hour on an Ehrman molder using a 38 x 60-inch bench are produced by a crew on piecework.

In the mixing process, separate sand and clay pits at basement level come to separate hoppers and to the weighing floor where mold formulas, precisely defined and secret to Omsteel, are carefully compiled. Air-operated doors, with meters to check oil and water, are features of the mixing machines, cleaned every night. The charge, after mixing moves by conveyor belt to elevator buckets and aloft 60 feet to another hopper with grinders that finalizes the mix into a silken smoothness, then it flows by conveyor belt to the eight molding machines.

Cores are placed on 60 x 48-inch shelved steel racks, Omsteel maintaining 210. Racks come into the baking oven, four to a charge, for a 1 to 2-hour baking cycle at 350-400° F. These ovens are oil-fired. Only 50 per cent of new sand is used in core making. Core molding benches have steel plates with countersunk fastenings so core makers cannot scratch their hands. Core plates are machine-surfaced and perforated for effective heat transfer. Core-baking is usually 1½ hours. Cores may stay in the baking oven all night and usually are charged into baking at 4 p.m.

Cleaning is in a separate 200-foot square building equipped with Wheelabrator and sandblast, swing grinders and the usual cleaning equipment. Here, the straightening press mentioned as cast so effectively, is installed. The Wheelabrator is used on small castings. It is new, automatic, continuous.

the Corporation President

WHO ALMOST SLEPT TOO LONG

T. M. Stanton* was having a nightmare. For months he'd been preoccupied with the production problems of Empire Gadgets, Inc. So preoccupied, he'd even half-admitted to himself that he was devoting far less thought to national problems than a leading citizen should. But the urgency of his immediate interests kept shoving these concerns into his subconscious mind. Now they were torturing his sleep.

"T. M., old boy," one spectre was saying, "how would you like a nice black depression to come along and swallow up your whole company?" And a green-eyed ogre leered, "While you're neglecting your free-enterprise system, we're moving in with *another* system!"

Stanton's body lurched. "No!" he thundered. Awakened, he scratched his head, murmuring, "Gad, what a dream! H-m-m—wonder what sort of contribution I ought to be making . . ."

Here's Something, Mr. President, You Ought to Do Right Away!

Check up on the status of the Payroll Savings Plan in your company. By making U. S. Savings Bonds easily available to your employees "on the installment plan," it benefits not only the employees but your business and the nation as well! Here's how:

(1) The Payroll Savings Plan builds financial security for each participant. The Bonds pay $4 at maturity for every $3 invested.

(2) The experience of 19,000 companies operating the Payroll Savings Plan shows that it makes employees more contented in their jobs—cuts down absenteeism—even reduces accidents!

(3) The Plan helps to spread the national debt and thus helps secure your business future. How this works is clearly and briefly described in the free brochure shown below.

Why Executive Backing Is Vital

Employees still want the benefits of the Payroll Savings Plan. In fact, they *need* the P. S. P., because banks don't sell Bonds on a partial-payment plan—which is the way most workers prefer to buy them. But war-time emotional appeals are gone. Human nature being what it is, the success of the Plan in your company is liable to dwindle unless a responsible executive *keeps promoting it.*

So—today—*check up* on the status of the Payroll Savings Plan in your company. *Act* on your responsibility to see that it is vigorously maintained.

The State Director will gladly help.

Be sure to read this! *"The National Debt and You," a 12-page brochure, brings you the views of W. Randolph Burgess, Vice Chairman of the Board of The National City Bank of New York —and of Clarence Francis, Chairman of the Board, General Foods Corporation. Request your copy from the Treasury Department's State Director, Savings Bonds Division.*

**This one is fictitious—but it might be any corporation president.*

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Master Tooling Dock—*Concluded from Page 89*

identical jigs or fixtures is such that the normal dock facilities are not extensive enough for production tooling work. However, few conventional masters can be utilized with the speed that characterizes tooling dock operations.

In the manufacture of streamlined structures, the dock has been particularly advantageous since it has improved the speed and accuracy with which contour masters or mockups can be constructed. A typical fabrication technique in this category can be outlined with the following operational sequence:

(1) A rough steel mockup structure is moved into the dock and positioned with regard to the dock reference lines the same as a rough jig or fixture structure.

(2) Contour templates are positioned for assembly to the rough structure by means of third-dimensional locations indicated on the transverse straightedge.

(3) When all contour templates are in place, the contour-master structure is covered with reinforcing mesh and faired-in with plaster or a similar material.

A modified version of the tooling dock, known as the "tooling ways", has been used with considerable success as a universal jig borer simply by mounting a transverse straightedge on two longitudinal straightedges for fore-and-aft adjustments. With this setup, hole locations can be accurately determined after the transverse straightedge has been stationed by mounting a small fixture (which supports a drill bushing) in a predetermined position on the transverse member.

While a master tooling dock can be adapted or modified for use in connection with almost any assembly-tooling program, it has been found that production-like tooling efficiency can be achieved only when engineering personnel are familiar with the unit and prepared to take advantage of dock-tooling features from the day a production design is begun. Among other things, it should be constantly borne in mind that: (1) Jig or fixture structures do not require machined surfaces for positioning locators, since the dock provides all necessary location points or reference lines. (2) Those dimensional controls which establish the positions of locational elements are produced by master layouts and basic engineering dimensions, and all arbitrary dimensions must be primarily related to rough tool structures. (3) Care must be taken to relate the axes of assembly designs and tool structures so that no particular difficulties will be encountered due to the awkward positions required by locators with reference to the dock straightedges.

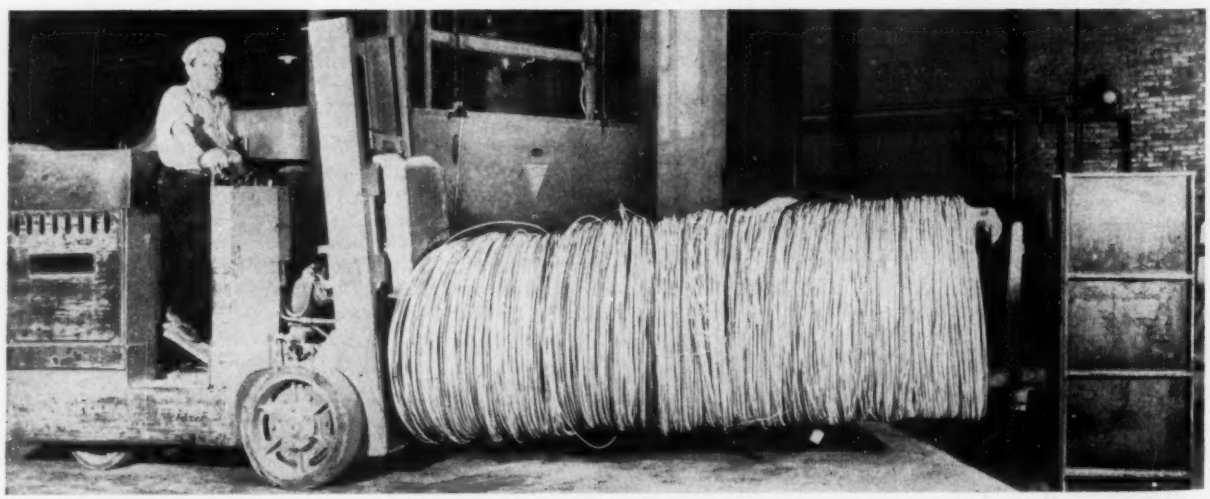
In most cases, the cost of a master tooling dock structure can be reduced or increased in conformity with the financial resources and production requirements of the prospective user. No really standardized dock designs are yet available, but practical tests proved that dock principles are applicable on almost any dimensional scale—from those of a small surface plate to the monster requirements of a shipyard.

To date, the smallest and least expensive version of the dock is a bench-type unit developed to facilitate the inspection of airplane propeller blades. Its maximum dimensions are less than 2 feet in any specific direction.

Hot Rolled Steel Bar Standard Submitted

Recommended commercial standard for hot rolled rail steel bars is being submitted to producers, distributors and users for acceptance, according to a Commodity Standard Division of the National Bureau of Standards announcement. The recommended standard gives strength requirements, dimensions and manufacturing tolerances for hot rolled rail steel bars, rounds, squares, octagons, diamonds, triangles, ovals, angles, flats and bands.

Provision is made for certifying and identifying material conforming to the recommended standard. As proposed by the Rail Steel Bar Association, it is thought that the selection, where possible, of standardized sections of the one quality of rail steel products will permit deliveries from stock resulting in a benefit to producers, distributors and users alike.



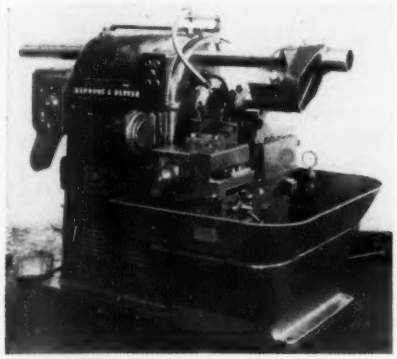
TELESCOPIC RAM: This 9-ft ram with a load of springy coiled wire rod has just left the bake house of the Trenton, N. J., works of American Steel & Wire Co., and is about to be butted against a well anchored steel bumper (at extreme right) to collapse ram and load to 6 ft. Thus truck with load is more maneuverable and more easily handled in this crowded shop. After unloading, hooked end of ram is engaged in a length of steel rope and the lost 3 ft are regained for a new load

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 134

1. Cut-Off Machine

Tubing, pipe and solid bar stock, fed through the hollow spindle by a motor driven roller feed, is cut off and chamfered by the No. 35 Hydralectric cutting-off machine announced by Bardons & Oliver Inc., Cleveland 13, O. A stock stop with solenoid operated release, gages the length of the work to close tolerance. Two hydraulically operated cut-



off slides, one front and one rear, are connected by an equalizing mechanism. With the two slides, cut-off time is considerably reduced.

Chamfering is done either by a drop-off tool on the rear slide or by on overhead chamfering attachment actuated automatically by the front slide. For parts requiring a boring, turning or drilling operation, in addition to cutting-off and chamfering, a longitudinal slide can be furnished. Collet chuck has a 5½-inch capacity and may be of either hinge or spring type. The 10 horsepower main drive motor is in the machine column. Sliding gears provide four quick change spindle speeds.

2. Scaling Hammer

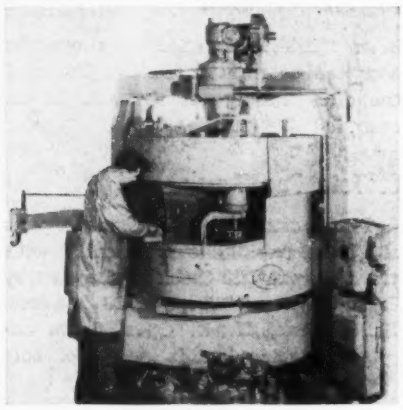
Weld spatter removal and flux scaling, rust removal, peening, star drilling and removing fins from castings may be carried out with the S-1

scaling hammer introduced by Rotor Tool Co., 17325 Euclid Ave., Cleveland, O. Air powered, this 3-pound tool has a graduated throttle control which gives a choice of blows to be delivered.

Chisel retainer allows easy removal by thumb pressure. The wafer valve is stainless steel. Chisels are furnished in blank, flat and spoon form. Star drills in sizes 3/16 to 3/4-inch are available.

3. Vertical Grinder

A new vertical spindle grinder, listed as No. 372-72-inch by its maker, Chas. H. Besly & Co., 118 North Clinton St., Chicago 6, Ill., features a power driven fixture into



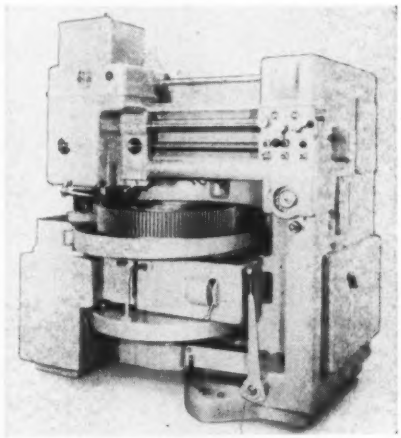
which the operator places the cast iron gear housings for which the machine was designed. In production runs, finish and flatness obtained are within 0.003-inch. Rotating fixture and revolving work holders carry castings through the grinding cycle at one revolution every 60 seconds.

Four pieces are ground simultaneously and approximately $\frac{1}{32}$-inch is removed. When smaller castings are ground, two or more can be placed in each work holder.

4. Gear Shaper

Massively constructed, a new gear shaper, marketed by Fellows Gear Shaper Co., Springfield, Vt., is adapted to the cutting of external and internal spur and helical gears. Its large one-piece cutter-spindle is designed to carry a 5-inch cutter and is operated by a heavy and rigid reciprocating mechanism. The apron carrying the work-spindle which has a 5⅞-inch straight hole, is supported in the base integral with the cabinet.

Twelve reciprocating speeds ranging from 18 to 300 strokes per minute are obtainable. Four rotary speeds are available through a 4-speed transmission. The cutter may be fed into depth by independently adjustable steps, determined by the number and position of the dogs. Rotation of work is determined at any depth of cut by a counter, mechanically



driven, which operates electrical contacts. Maximum capacities are: Pitch diameter, 36 inches; diametral pitch, 3 spur, 4/5 helical; face width, 5 inches; helix angle, 45 degrees.

5. Parts Dryer

Small parts may be rapidly and efficiently dried before and after electroplating by the combination steam heated sawdust barrel and sawdust separator, made by Belke Mfg. Co.,

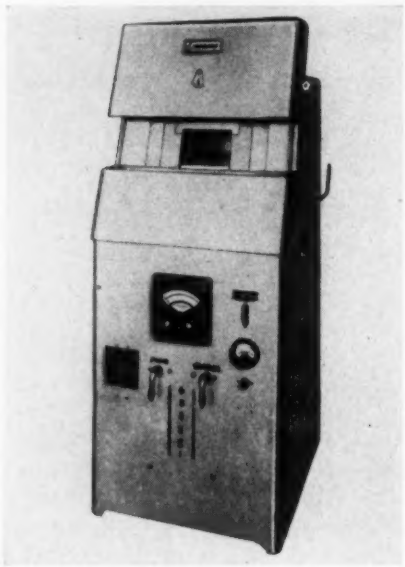
947 North Cicero Ave., Chicago 51, Ill. The barrel dries the work, leaving it bright, clean and free from water spots. Steel ribs welded to the barrel sides assure tumbling action.

Tilting the barrel empties the work into the separator. Operating the separator sifts the sawdust into a

drawer below, leaving the clean work in the hopper which tilts to slide the work via a chute into a container.

6. Laboratory Furnace

With temperatures up to 3000°F top heat and for continuous operation as high as 2500°F, a new box type laboratory furnace, built by Lindberg Engineering Co., 2444 West Hubbard St., Chicago 12, Ill., is a self-contained unit which may be used as a



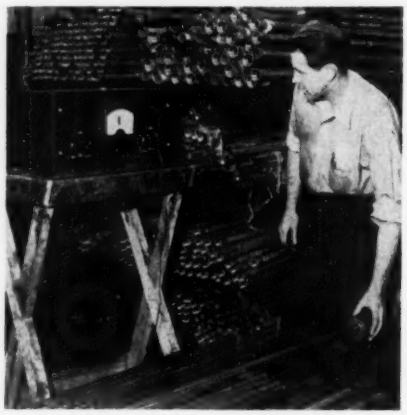
muffle furnace, or with carbon blocks for nonoxidizing atmospheres. Ten silicon carbide Globar heating elements insure uniform heating.

Furnace temperatures are regulated by an indicating-controlling pyrometer with electronic circuit. Designated as model G-10, it is for operation on 230 volts, 60 cycle, single phase alternating current. An 8 kilowatt variable voltage transformer is used with two tap switches, each with six voltage regulation control points.

7. Metals Comparator

Quick, nondestructive comparison of either magnetic or nonmagnetic metal parts with a standard is possible with the electronic metals comparator, a development of General Electric Co., Schenectady 5, N. Y. It may be used to differentiate between annealed and unannealed steel bars and to sort finished metal parts with different compositions or heat treatments.

Instrument employs a balancing network and indicating instrument mounted in a steel cabinet to which is connected an external test coil. In operation, a reference specimen is placed in the coil and adjustment made to secure the initial balance, indicated by zero reading. Reference specimen is then removed and parts to be tested are inserted in the coil one by one. When tolerances have



been established, specimens can be accepted or rejected on the basis of the dial reading—at the rate of as many as 1500 per hour.

8. Tote Pan Truck

Transporting and lifting tote pans singly or in stacks is possible with the tote pan lift truck announced by Lyon-Raymond Corp., 4626 Madison St., Greene, N. Y. Open forks engage the side handle or lip of tote

pans and lift the entire load by a downward push of the operating handle.

Truck has a capacity of 600 pounds and is designed of tubular and formed steel parts. An automatic lock holds the load in the elevated position, a pedal release controlling lowering. Swivel casters allow it to be manuevered into cramped quarters.

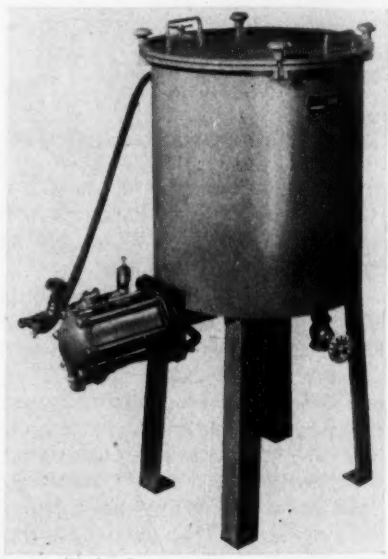
9. Vacuum Lifter

Danger to operator while positioning blanks in forming presses and stamping machines is eliminated with the vacuum lifter designed for lifting, feeding and positioning sheets of metal by Industrial Products Co., 2833 North Fourth St., Philadelphia 33, Pa. It may be used with equal success on other nonporous materials and also on blanks of curved contour, fiber, plastic, tile and glass.

Operation is by striking its rubber cup against the material to be handled, this producing and retaining a vacuum within the cup. Vacuum is released by depressing a trigger. Cup is held to handle by a concealed soft brass bolt molded in the rubber. Overall length is 15 inches and height at cup end is 1½-inches.

10. Adhesive Mixer

An air driven, variable speed mixer for the mixing of adhesives and other materials, built by Union Tool Corp., Warsaw, Ind., utilizes an oscillating beater. Mixer is of welded steel construction and its double action air cylinder is of seamless brass tubing with cast and malleable steel fittings.



It may be equipped with either hot or cold jackets. Mixes may be delivered without separation by keeping the agitator oscillating during draining.

Mix may be delivered under pressure by introducing air under pressure into top of mixer and opening the bottom drain. Two models with capacities of 10 and 20 gallons are made.

11. Brinell Tester

A motor driven, hydraulically operated brinell testing machine, announced by Steel City Testing Machines Inc., 8843 Livernois, Detroit 4, Mich., is capable of checking up to 800 pieces per hour. Although they may vary in diameter and thickness by as much as ¾-inch, they may be checked without moving the elevating screw. Designated as model KDR, it is so constructed that the operator

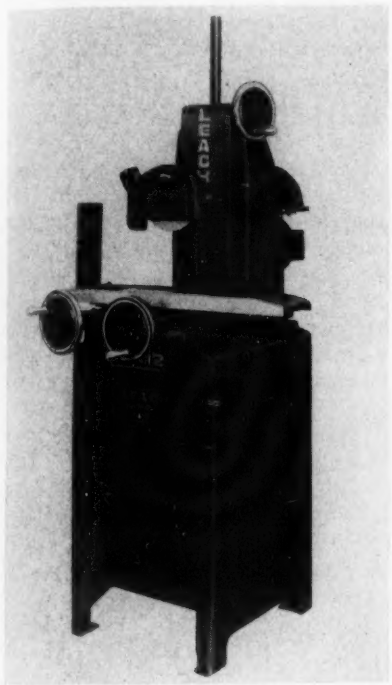
(For more information, use the card following page 134.)

cannot remove the specimen being tested before the full load has been applied.

Load is held for a predetermined time cycle (adjustable from 2 to 15 seconds), after which time the penetrator reverses itself. Machine is equipped with a comparator indicator. It may have a foot or knee type starter switch. Throat opening is 6 inches and maximum vertical opening is 14 inches.

12. Surface Grinder

A compact, self-contained surface grinder, made by H. Leach Machinery Co., Providence, R. I., has a two-speed ball bearing spindle, is driven by a



3/4-horsepower motor and is completely equipped with dust guards. The 6 x 12 inch grinder uses a standard 5 x 10-inch magnetic chuck and a 7 x 1/2 x 1-1/4-inch wheel. Hand operating wheels are centrally located for ease in operation and better visibility.

13. Shunt Capacitor

For operation on 2400 volt delta or 4160 volt wye distribution circuits, an 1800-kvar shunt, factory assembled with breaker and relays for voltage or current control, is announced by Westinghouse Electric Corp., Pittsburgh 30, Pa. Called the Autotrol, it is mounted in an all welded steel housing, is weatherproof and may be mounted at base of pole or on a crossarm.

Contained within the capacitor are twelve 15-kvar, single phase 2400

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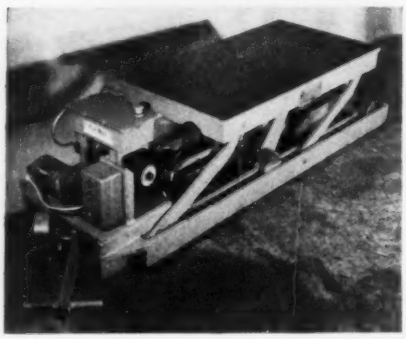
volt, individual Inerteen capacitor units, fuses for each capacitor unit, an oil switch, potential transformer and control panel with relays. Natural draft ventilation is provided. Units are available without voltage and current control features and may be equipped with manual or time-switch control.

14. Sheet Lifter

Maintenance of a constant working height of sheet steel packs at presses and shears is possible with the hydraulically operated sheet lifter, developed by May-Fran Engineering

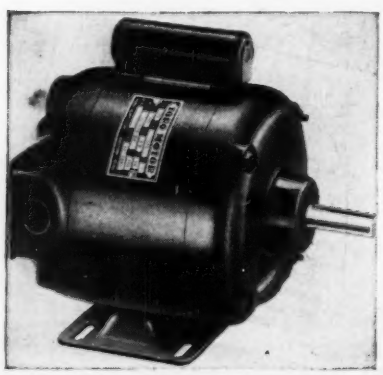


Inc., Cleveland 12, O. In lowered position, its minimum height is 11 inches to top of table. In raised position, table top is 30 inches above floor. Lift capacity is 12,000 pounds.

Lift time is adjustable from a minimum of 2 minutes to any number of hours. Device is equipped with a Graham variable speed transmission, with attached 3/4-horsepower motor and a Seco pump. Table size is 28 x 72 inches.

15. Fractional HP Motors

High torque starting characteristics and triple seal windings are features of the type CSI capacitor-start fractional horsepower motors made by



Torq Electric Mfg. Corp., 1083 Interstate St., Bedford, O. Rotors are of all welded, pure copper bar construction. These features provide for a low starting current combined with high starting torque.

Motors are of splash proof design, have steel frames and die cast aluminum alloy end bells with cast-in terminal for easy wiring. Either solid or resilient bases are offered, slotted for belt adjustment. Frame ratings of 1/6, 1/4, 1/3 and 1/2-horsepower, single phase, 60 cycle, 115-230 volts can be supplied.

16. Gear Testing Machine

David Brown Tool Co. Ltd., Huddersfield, England, is announcing a universal worm gear testing machine which provides an accurate and rapid means of checking all dimensions upon which the performance and interchangeability of a worm depends, and

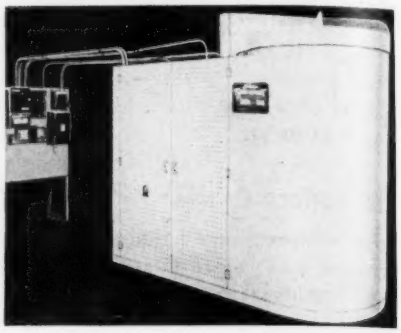
for testing finished wheels in conjunction with a master worm. There is a provision for an auxiliary slide for the various worm testing instruments, all of which may be adapted without disturbing headstock centers.

Concentricity of worm, thickness pressure angle, and pitch and indexing of worm threads, thickness and teeth and contact area on the worm wheel teeth may be checked. Maximum center distance is 300 mm or 12 inches, maximum diameter of worm is 150 mm or 6 inches and maximum length of wormshaft is 760 mm or 2 feet 6 inches.

17. Recirculating Furnace

Reversal at regular intervals of the flow of gases through the work is a feature of the new recirculating furnace, built by Sunbeam-Stewart Industrial Furnace Division, Sunbeam Corp., Chicago, Ill. A damper arrangement is employed to give any reversing cycle desired. The furnace has application in the heat treatment of any high stress parts.

Work is brought up to the desired temperature faster and the final temperature variation through the work is negligible. The reversing cycle timer is adjustable from 30 seconds to 5 minutes. Its fan has a capacity of 4800 cubic feet per minute. Door



lift may be air or hydraulic, hand or foot valve, or electric switch. Maximum temperature is 1250° F.

18. Flexible Welder

Useful for making welds that are inaccessible for fully automatic welding, the new Unionmelt flexible welder, made by Linde Air Products Co., 30 East 42nd St., New York 17, N. Y., makes short welds where it is not worthwhile to mechanize the operation. Building up deposits of almost any size or shape and deposit-

ing metal to repair weld or casting defects is possible.

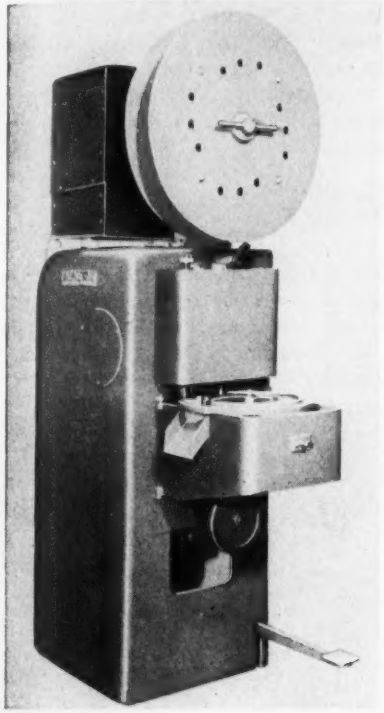
Feature of the machine is the welding nozzle, at the end of a 20-foot flexible hose, which can be moved from one weld to another without stopping to set up track, carriage or guiding equipment. Hose contains welding current cable and tubes through which welding rod and granular material are fed. Up to 5/32 inch rod in 25 pound coils may be used by the machine which also includes a tank holding 75 pounds of the granular welding composition, fed by compressed air. Capacity is

(For more information, use the card following page 134.)

900 amperes, direct or alternating current.

19. Butt Welder

Agnew Electric Co., Milford, Mich., is manufacturing a special purpose automatic butt welder for the welding of nickel ground wire to spark plug shells. Designated as type SP B-2, it has fully synchronous control of welding current and time. After operator places shell in indexing table, wire is taken from reel, fed to length, clamped, cut off, welded to shell and the part is ejected automatically.



Driven by a motorized reducer unit through an adjustable friction clutch, the machine operates as long as the pedal is depressed. Hand operation is provided for setup purposes and 16 position table for loading shells in five positions. Production is 3600 pieces per hour.

20. Equalizing Slings

Capacities ranging from 3/4 to 12 tons, with a safety factor of five, are available in the line of Adjust-A-Leg equalizing slings, offered by Caldwell Co., 1830 Camp Ave., Rockford, Ill. They are designed to lift odd shaped and unbalanced loads level or at almost any predetermined angle. Equipped with wire rope, the equalizing unit is made up of a sheave carried by a spring-mounted axle and a pair of brake shoes. Rope, with hook on each end, lays over sheave.

Lifting allows the sheave to revolve and make the legs lengthen and short-

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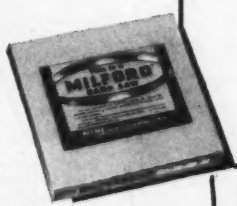

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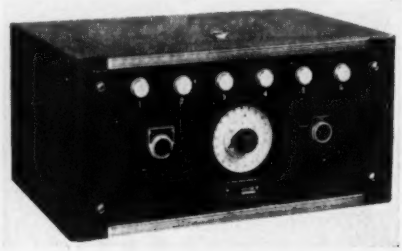
en, adjusting themselves to the load weight distribution. When load weight applies tension to legs, the rope is pulled into the groove, holding it in place, and sheave is pulled into the brake shoes, frictionally locking the legs until pressure is released.

21. Atmosphere Selector

Dew point recorder effectiveness is increased by a new selector for atmosphere gases, made by Surface Combustion Corp., Toledo 1, O., which enables that instrument to analyze consecutively atmospheres from as many as six different sources in

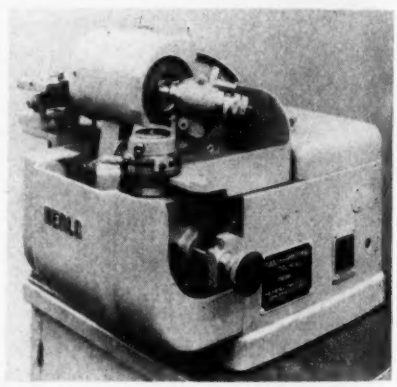


timed sequence. The selector consists primarily of a six-way valve for the six incoming atmosphere sources, a motor and an electric time clock, so arranged so that at a preset time the source of atmosphere supply to the dew point recorder is automatically switched from one line to the next.

The five remaining lines are continuously purged so that when the next source is to be analyzed, no purging time is lost. Pilot lamps indicate the atmosphere source being analyzed. A pushbutton manually transfers the inlet valve to the next station or source line, if such action is desired. Frequency at which atmospheres may be analyzed is set by a control dial on the front of the instrument.

22. Tool Sharpener

Accurately lapping sharp edges to the correct shapes, the new Bore-Matic model 2 tool sharpening machine, announced by Heald Machine Co., Worcester 6, Mass., accomplishes this automatically, thereby eliminating the errors resulting from hand grinding. Adjustment can be made for any desired shape of tool after which the operator merely inserts the tool in the holder, starts the machine and removes it after the automatic grinding.



Sharpener is provided with a course for roughing tool surfaces preliminary to finish grinding. Odd shaped tools may be finished on an off-hand grinding attachment using a fine-grit diamond wheel.

23. Plating Rectifiers

Low voltage high current rectifiers for electroplating, electrolytic cleaning or use as a power source are announced by Mellaphone Electronic Rectifier Co. Inc., Rochester 2, N. Y. A direct current output voltage is variable from 0 to 6 volts with a capacity of 600 amperes or from 0 to 12 volts with a capacity of 300 amperes.

Features include selenium rectifier elements which are thoroughly sealed,

Here's Proof of Performance!
Comparison of Costs of Lining Soaking Pits In A Well-Known Steel Mill
Explanation—Convinced that the most accurate method of comparing the relative costs and performance of Buckeye Silica Firestone with another material used for many years, a test under identical operating conditions was conducted by a well-known steel plant with the following results:
Buckeye Silica Firestone
Other Material
Maintenance cost per ton of ingots heated .0005 .0033
Installation cost per ton of ingots heated .0069 .0089
Total cost: Maintenance and installation .0074 .0122
Approximate life of soaking pit linings 4½ yrs. 2 yrs.
Increased cost of other material over stone 64.8%
Average annual maintenance cost, ratio of stone to other material: 1 to 6.
You, Too Can Enjoy Buckeye Efficiency and Economy
Buckeye's record in hundreds of other steel plants indicates what it can do for you. A Buckeye service engineer will gladly point out its many advantages and discuss its application to your particular problem. Write!
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THE CLEVELAND QUARRIES COMPANY
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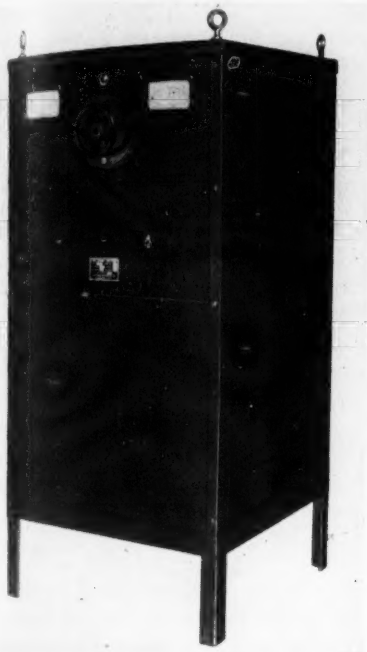
• Full explanation of Buckeye is found in Bulletin 15-B
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

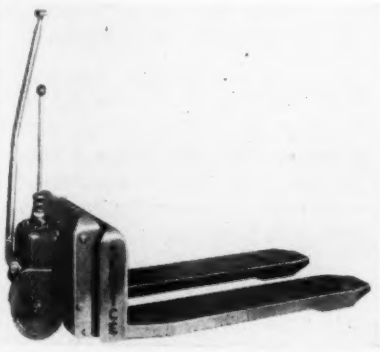
smooth stepless control over output voltages provided by a heavy duty variable voltage transformer, a 4½-



inch ammeter and voltmeter and protection against overloads and failure of ventilation system.

24. Pallet Lift Truck

A set of "toggle booster" rollers that float the truck frame over the bottom face of the pallet so that it is not displaced from its position, is a feature of the Leverlift lift truck for double faced pallet handling, made by Service Caster & Truck



Corp., Albion, Mich. Its short stroke vertical pump handle enables the operator to easily elevate the load. A hand operated release valve permits fast or slow lowering speed.

Truck is of pressed steel arc welded construction. It is available in 400 pound capacity and has a lowered height of 3¼-inches, a lift of 4 inches, and an overall height of 27 inches. Front wheels are 10 inches in diameter. Fork lengths are 36, 42, 48, 54 and 60 inches. Operation may be

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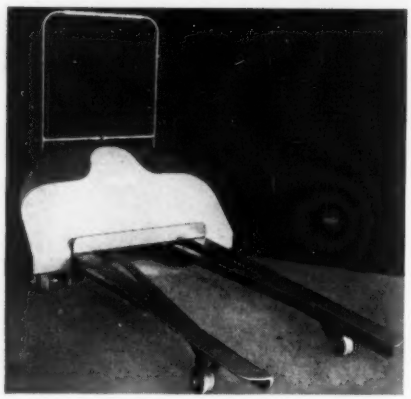
as an in-between when used with power-operated fork lift trucks.

25. Hand Pallet Truck

A hydraulically operated hand pallet truck, manufactured by Sherman Industries Division of Sallinger-Sherman Inc., 138 Brookline Ave., Boston 15, Mass., is of 2000 pounds capacity and operated by a standard



hydraulic jack unit. The unit can be replaced in 5 minutes without tying up the truck.

Two of its four wheels swivel 360 degrees, permitting manuevering in close quarters with handle locked in vertical position. The four-point support afforded by the location of the wheels provides great stability for high tiered or uneven loads. Truck will handle all standard pallets and has a lift of 2½-inches.

DEVELOPED BY . . .

26. Hydro-Power Division of Hydraulic Press Mfg. Co., Springfield, O., the Ten-Ton-Tony midget hydraulic power unit for such applications as arbor presses, vises, forming and bending devices, etc.

27. Marion Electrical Instrument Co., Manchester, N. H., a rectangular bakelite-cased model 56 meter with space for a multirange scale. It has a 100 degree arc and a 5-1/2-inch scale length.

28. Redmond Co. Inc., Owosso, Mich., 6-pole shaded pole fractional horsepower electric Micrometors. Designated as type Y, the line includes ventilated and totally enclosed models of up to 1/15 and 1/20-horsepower, respectively.

29. Merrill Brothers, Maspeth, N. Y., the Merrill-Volz positive grip clamp for raising or lifting into place large tanks, flanged heads and similar articles. It is made in 1/2, 1, 3 and 6 ton sizes.

30. B. F. Goodrich Co., Akron, O., a hot material conveyor belt using glass fabric. It is offered in 4 and 5-ply weights with a ply of longitudinal nylon in the top cover of the belt.

31 Davey Compressor Co., Kent, O., line of electric portable compressors in 60, 105, 160, 210 and 315 cubic feet per minute capacities. They are available in skid, 2-wheel trailer and 4-wheel trailer mountings.

32. Wellman Bronze & Aluminum Co., Cleveland 3, O., a magnesium barrel skid, weighing 33 pounds, but with 800-pound capacity. Cast hooks and shoes of the 9-foot skid are replaceable.

33. Metron Instrument Co., Denver 9, Colo., multiple-section miniature speed changers for low power speed changing applications requiring high ratios. Five hundred ratios from 9/10 to 3375 may be supplied.

34. Industrial Metal Protectives Inc., Dayton 2, O., two new types of anti-corrosive Zincilate coatings which will air dry without baking. Flexible enough that they may be bent double, coatings may be applied by dip, spray, brush or roller.

35. Reed Roller Bit Co., Houston, Tex., a Cleco Handi-Drill which hits and rotates at the same time. Weighing 9 pounds, it has a drill capacity of 1/4 to 3/4-inch and has a safety drill retainer.

36. Metallizing Engineering Co. Inc., Long Island City 1, N. Y., a light duty-low air L gun for metallizing. It assures lower cost per pound of metal sprayed because of low consumption of acetylene and oxygen.

37. Link-Belt Co., Chicago 1, Ill., P. I. V. gear variable speed changer, rated 20 to 25 horsepower. Lowest rating of H-6 unit gives ratios of 5 to 1 and 6 to 1, while highest rating gives ratios of 2 to 1, 3 to 1 and 4 to 1.

38. Air Reduction Sales Co., New York 17, N. Y., hand torch for cutting stainless steel using the company's flux-injection process. It has Monel metal head, stainless steel tubes, lever and ribbed handles and remote control cut-off.

39. Wyzenbeek & Staff Inc., Chicago 22, Ill., the Handy-Matic motorized portable repair shop has a flexible shaft machine mounted on a cabinet containing 25 accessory tools and other supplies.

40. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., contactors of 1500, 3000 and 6000 amperes for operation on up to 750 volts direct current. They are single pole, magnetically operated, frame mounted, normally open or closed units.

41. Yale & Towne Mfg. Co., Philadelphia 24, Pa., wire rope hoists of 1/4, 1/2 and 1-ton capacities, equipped with large diameter drum, grooved for guiding cable as it winds.

42. Eltron Inc., Jackson, Mich., a circuit tracer (model 104C) consisting of a 9-pound detector-amplifier with self-contained tubes and batteries, pick-up loop and extension pole, for tracing concealed wiring, cables, etc.

43. Quincy Compressor Co., Quincy, Ill., three new portable compressors, electric motor or gasoline engine powered, for various uses, including spraying, riveting, chipping, etc. Capacities range up to 44 cubic feet per minute.

44. Ingersoll-Rand Co., Phillipsburg, N. J., the Wagonjack drill for use in construction, building and mining fields. Mounting a J-50 Jackhamer or a DA-30 drifter, it is driven by an air motor.

45. United Transformer Corp., New York 13, N. Y., a line of audio components, input transformers, modulation, power and filament transformers for industrial electronics use.

46. Wilshire Power Sweeper Co., Pasadena 8., Calif., an all purpose power sweeper that keeps floors free of welding rod butts, nails, chips, dirt, waste material, etc. Driven by a gasoline motor, it has a 36-inch sweep.

47. Enthone Inc., New Haven 2, Conn., inhibitor No. 9 for use in both hydrochloric and sulphuric acid solutions. Dissolving readily, it may be used where exhaust ventilation is not available.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL UNAFFECTED—Recent break in the commodity and stock markets has had little apparent affect to date on demand for steel. Requirements for most products are so far in excess of supply that whatever easing in pressure may have resulted is difficult to discern.

It is recognized, however, that certain psychological influences are bound to be felt. The break, unquestionably, has alerted steel buyers to need for caution in ordering, especially on the more extended programs.

OPINION BULLISH—Steel and metalworking leaders do not expect a business tailspin. They regard recent developments, especially in commodities, as a needed readjustment which should prove salutary on the whole economic situation. With respect to easiness in securities they are perplexed but incline to the view this was largely sympathetic, not a reflection of a basic change in industrial conditions. What is happening, they say, is an overdue halting of the spiral of prices.

SCRAP WATCHED—Of the various items identified with steel and metalworking, scrap reflected the break in commodities and stocks more clearly than any other. With scrap a highly mercurial commodity, and prices under pressure as result of buyers withholding from the market, the setback in commodities and securities appears to have softened scrap sellers' resistance somewhat, although leaving the market with much underlying strength. However, the fact that 200,000 tons of steelworks scrap were placed within the past week at the steelmakers' formula price of $40.50, Pittsburgh, supports the view scrap sellers' confidence in a continued price uptrend in this market has been undermined.

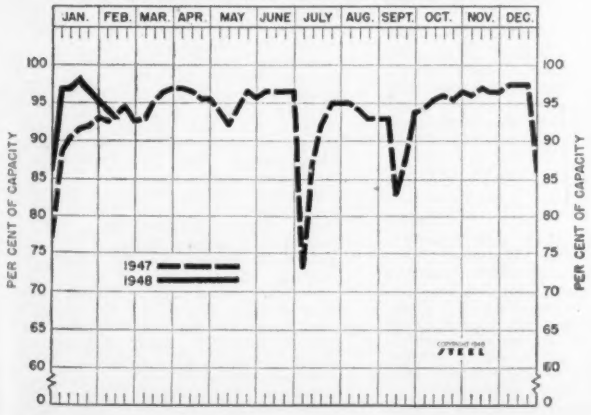
SECOND QUARTER QUOTAS—Steelmakers who have not yet taken action in entering specifications for second quarter are now the exception. In general producers have endeavored to set up quotas allowing for carryovers and possible adjustments necessitated by the voluntary allocations program. Broadly, consumers are promised about the same tonnage as in first quarter. The voluntary allocations program continues to shape up slowly.

STEEL PRICES—Uncertainty as regards the trend of steel prices over coming months has been heightened by the break in the commodity and stock markets. The effect of the break on labor's demands for wage increases will be an important factor bearing on the price question and until it is definitely clear just what labor's reaction will be it is hazardous to even guess what will transpire pricewise over coming months. There is no doubt, however, that the break in commodities has put the whole question of prices in a somewhat different light than has prevailed in recent weeks.

Apparent acceptance of "formula" prices for steelmaking grades of scrap held STEEL's composite price at $40.58, the same level as in the previous week, compared with $33.75 in the like week a year ago. Finished steel composite was unchanged from last week at $78.59, compared with $69.82 a year ago; the semifinished steel composite likewise remained steady at $65.60, against $52.10 in the week ended Feb. 15, 1947, and steelmaking pig iron was stable at $39.23, compared to $29.56 a year ago.

STEELWORKS OPERATIONS—Continuing cold weather, intensifying the gas and fuel oil shortages and adding to transportation difficulties, forced further reductions in steel production last week, the national ingot rate dropping one point to 93 per cent of capacity. Operations in Pittsburgh declined 3 points to 89 per cent; Wheeling's rate was off 1½ points to 88.5, Cincinnati two points to 85, and New England and eastern Pennsylvania each one point to 79 and 90 per cent, respectively. Cleveland reported a 1½ point gain to 96 and Buffalo a 2½ point rise to 86 per cent.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Feb. 14	Change	Same Week 1947	Same Week 1946
Pittsburgh	89	— 3	93	1.5
Chicago	92.5	None	92	4.5
Eastern Pa.	90	— 1	89	6
Youngstown	102	None	89	0
Wheeling	88.5	— 1.5	84.5	56
Cleveland	96	+ 1.5	91	0
Buffalo	86	+ 2.5	90.5	0
Birmingham	100	None	99	0
New England	79	— 1	90	10
Cincinnati	85	— 2	90	44
St. Louis	78	None	69	19
Detroit	92	None	92	32
Estimated national rate	93	— 1	93.5	5.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Feb. 14	Feb. 7	Month Ago Jan. 1948	Year Ago Feb. 1947	5 Years Ago Feb. 1943
Finished Steel	$78.59	$78.59	$78.26	$69.82	$56.73
Semifinished Steel	65.60	65.60	60.46	52.10	36.00
Steelmaking Scrap	40.58	40.58	40.75	33.50	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Nov. 1947	3.47536c
Oct. 1947	3.45536c
Nov. 1946	2.87671c
Nov. 1942	2.36750c

* Straight Arithmetical Composites: Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Finished Steel arithmetical composite, dollars per net ton on net ton basis; others, gross ton.

† Finished Steel Weighted Composite: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 81 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates; standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Feb. 14, 1948	Jan., 1948	Nov., 1947	Feb., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.348	3.318	2.98
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.50
Shapes, del. Philadelphia	2.968	2.966	2.954	2.64
Shapes, Chicago	2.80	2.80	2.80	2.50
Plates, Pittsburgh	2.95	2.95	2.95	2.65
Plates, del. Philadelphia	3.19	3.186	3.17	2.85
Plates, Chicago	2.95	2.95	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.93	3.90	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.93	3.90	3.55
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.775	3.675	3.675	3.425
Wire nails, Pittsburgh	4.70	4.67	4.625	4.125
Tin plate, per base box, Pittsburgh	$6.70	$6.70	$5.75	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$50.00
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	42.00
Rerolling billets, Pittsburgh	47.50	47.50	47.50	42.00
Wire rod ⅜ to ¼-inch, Pitts.	3.175c	3.10c	3.05c	2.55c

Pig Iron

	Feb. 14, 1948	Jan., 1948	Nov., 1947	Feb., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$40.379	$37.913	$31.83
Basic, Valley	39.00	38.40	36.00	30.00
Basic, eastern del. Philadelphia	42.004	41.372	38.84	32.01
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	39.879	37.418	31.33
No. 2 fdry., del. Philadelphia	42.504	41.871	39.34	32.51
No. 2 foundry, Chicago	39.00	38.60	36.00	30.50
No. 2 Foundry, Valley	39.50	36.50	36.50	30.50
Southern No. 2, Birmingham	37.88	34.88	34.88	26.88
Southern, No. 2, del, Cincinnati	40.74	37.74	38.544	31.75
Malleable, Valley	39.50	38.90	36.50	30.50
Malleable, Chicago	39.50	39.10	36.50	30.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	50.00	46.40	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.50	$40.30	$40.00	$34.40
Heavy melt. steel, No. 2, E. Pa.	39.00	41.30	41.625	33.25
Heavy melt. steel, No. 1, Chicago	39.25	39.05	38.75	31.25
Heavy melt, steel, No. 1, Valley	40.25	40.04	39.875	34.56
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.625	32.50
Heavy melt. steel, No. 1, Buffalo	43.50	43.30	41.81	34.06
Rails for rerolling, Chicago	54.75	60.00	56.25	38.50
No. 1 cast, Chicago	66.00	63.50	49.00	42.50

Coke

Connellsville, beehive furnace	$12.50	$12.50	$12.25	$8.875
Connellsville, beehive foundry	14.75	14.60	14.50	10.00
Chicago, oven foundry, del.	19.25	19.19	18.60	16.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $85 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-58; Detroit, del., $61.20; eastern Mich., $62.60.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69.20, eastern Mich., $70.60.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom.; sales in open market $95-$105.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70.

Wire Rods: Pittsburgh, Chicago, Birmingham, ⅜ to ¼-inch., inclusive, $2.80-3.55 per 100 lb. ⅜ to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.392c; Phila., del., 3.356c; San Francisco (base, del.), 3.6345-3.95c; Los Angeles (base, del.), 3.629-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c, double refined 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.544c; San Francisco, (base, del.), 3.5495c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71c; Eastern Mich., del., 3.78c; New York, del., 4.042c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.35c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.724c; San Francisco (base, del.), 4.7295c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c Granite City 5.00c and 5.35c, respectively. Los Angeles (base, del.), 5.344c; San Francisco (base, del.), 5.3495c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.95c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. **Armature:** Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. **Electrical:** Pittsburgh, Chicago, Gary, 5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c. **Motor:** Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.50c.

Dynamo: Pittsburgh, 6.75c; Granite City, 7.20c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.71c; eastern Mich., 3.78c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.55 to 0.70 lb tin, $5.20; 0.75 to 0.95 lb tin, $5.10; 100 to 128 lb tin, $5.20.

Hollowware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del., 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.693c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 4.75c, basing points.)

Floor Plates: Pittsburgh, Chicago, Cleveland, 4.20c

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling; No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41-3.474c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.543c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55–4.00
Basic MB Spring (except Birm.)	**$4.95
Upholstery Spring (except Birm.)	†$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality	
Annealed (6 to 8 base)	††$4.20
Galvanized (6 to 8 base)	††$4.65

(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails	
Standard, cement-coated, galvanized	‡94
Staples, polished and galvanized	‡‡94
Woven fence, 15 gage and heavier	$100
Barbed wire, 80-rod spool	§§113
Fence Posts (with clamps)	107
Bale ties, single loop	$99

* Worcester, $3.65, Duluth, $3.60, base, San Francisco (base, del.), $4.56, bright basic only.
** Worcester, $5.05; Duluth & Trenton, N.J., $5.20 (bright only); San Francisco (base del.) $5.9845.
† Worcester $4.70. Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.6345 black upholstery.
†† Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed, $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.
‡ Worcester 100; Cleveland 97; San Francisco (base, del.) 115.
‡‡ Worcester 100; San Francisco (base del.) 115.
§ San Francisco (base del.) 123.
§§ San Francisco (base del.) 133.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.
Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2¼"	12	20.47	24.54	19.86	23.80
2½"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	46 off	....
½-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
9/16-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws
(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
7/16-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	46.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	40.74	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del	40.25	40.75	41.25	....
‡Neville Island, Pa., base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $3 higher for No. 2 foundry and malleable and $2.50 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended Feb. 8.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$47.50
6.51-7.00..$48.75 9.01- 9.50. 55.00
7.01-7.50.. 50.00 9.51-10.00. 56.25
7.51-8.00.. 51.25 10.01-10.50. 57.50
8.01-8.50.. 52.50 10.51-11.00. 58.75
8.51-9.00.. 53.75 11.01-11.50. 60.00

Fob Jackson, O., per gross ton; Buffalo base $3.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$55.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00-15.50
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$18.75
Chicago, outside del.	18.00
Chicago, del.	19.25
Terre Haute, ovens	18.50
Milwaukee, ovens	18.75
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	18.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	20.15
Detroit, del.	19.00
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	17.00

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	83.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheet, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	6.00	...	...	...	...	6.00	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *19G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅝"-¾"	Floor ⅝" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
New York (city)	4.96	6.18	5.88	....	7.51	5.58	....	5.06	5.80	7.33	4.80	5.11	6.78
New York (country)	4.81	6.03	5.73	....	7.36	5.43	....	4.91	....	....	4.65	4.96	6.63
Philadelphia (city)	4.70	6.32	5.92	5.90	7.25	5.32	5.72	4.87	5.75	8.77	4.57	4.85	6.47
Philadelphia (country)	4.55	6.18	5.78	5.75	7.10	5.17	5.57	4.73	....	....	4.47	4.71	6.32
Baltimore (city)	4.32†	5.95	5.65	5.72	7.07	4.80	....	4.85	5.71	....	4.71	4.77	6.30
Baltimore (country)	4.17†	5.80	5.50	5.50	6.85	4.65	....	4.70	....	....	4.56	4.62	6.15
Washington (city)	4.81	....	....	....	....	5.05	....	5.14	5.79[13]	....	4.95	5.03	6.60
Washington (country)	4.71	....	....	....	....	4.95	....	5.04	....	....	4.85	4.93	6.50
Norfolk, Va.	4.90	....	....	....	....	....	....	5.20	6.00	....	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[30]‡‖	5.87[30]†	....	6.37	....	5.02[30]	....	4.97[30]	5.87	....	4.97[30]	5.17[30]	6.87[30]
Memphis, Tenn. (country)	4.72[30]‡‖	5.77[30]†	....	6.27	....	4.92[30]	....	4.87[30]	5.77	....	4.87[30]	5.07[30]	6.77[30]
Buffalo (city)	4.45	....	5.20[3]	6.05	....	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	....	5.05[3]	5.50	....	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25‡‖	....	5.10[3]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10‡‖	....	4.95[3]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[3]	5.20[3]	5.81	7.06	4.55	5.35	4.40	5.10	6.85	4.68	4.60	6.18
Cleveland (country)	4.30	5.35[3]	5.05[3]	....	....	....	5.20	4.25	4.95	....	....	4.45	
Cincinnati	4.56	....	5.22	5.77	....	4.77	....	4.78	5.49	....	4.82	4.98	6.47
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[3]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[3]	5.20[3]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[3]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[3]	5.05[3]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[3]	4.25	4.45	5.90
Milwaukee	4.658	5.708[3]	5.408[3]	5.858	7.106	4.558	5.658	4.608	5.308	7.208[3]	4.608	4.808	6.258
St. Louis	4.78	5.83[3]	5.53[3]	6.02	7.27	4.68	5.82	4.73	5.47[13]	....	4.73	4.93	6.38
Birmingham (city)	4.45[30]‡‖	....	....	5.65	....	4.45[30]	....	4.40[30]	5.93[30]	....	4.40	4.65	6.80
Birmingham (country)	4.30[30]‡‖	....	....	5.50	....	4.30[30]	....	4.25[30]	....	....	4.25	4.50	....
New Orleans	4.98[30]**	....	6.29[13]	....	....	5.18[30]	....	5.13[30]††	6.29[13]	....	5.03[30]††	5.33[30]	7.29[30]
Omaha, Nebr.	5.462	....	....	6.712	8.012	5.362	....	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.75	....	....	7.36	8.10	6.00	....	5.35	7.00[13]	....	5.85	5.85	6.50
Los Angeles (city)	5.75	7.75[3]	7.45[3]	7.40	8.80	6.05	8.70	5.50	7.35[30]	9.35[10]	5.35	5.55	7.68
Los Angeles (country)	5.60	7.60[3]	7.30[3]	7.25	8.65	5.90	8.55	5.35	7.20[3]	9.20[10]	5.20	5.40	7.50
San Francisco	5.20[21]	6.65[3]	....	6.85[3]	7.75[3]	5.75[21]	8.70[10]	5.05[21]	7.00[13]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]‡‖	....	7.10[3]‡	6.95	....	5.60[17]	....	5.45[17]	7.45[13]	8.50[13]	5.25[17]	5.55[17]	7.65[17]
Portland, Oreg.	5.30[17]‡‖	....	7.10[3]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[13]	....	5.25[17]	5.45[17]	7.55[30]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [25]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c for 100 lb for slow moving items; §§18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%; Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si, carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained, Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si, carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb of briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.). $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis. 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, 100 lb or more, 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot, add 5c

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo. fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Nonferrous Metals Subsidies Held Inadvisable

Mine group told premiums not needed under current conditions. Scrap, brass ingot prices decline

NEW YORK—Easier scrap prices, resulting from heavy offerings and reflecting the psychological effect of the drop in commodity prices, continue as the most pronounced feature of the nonferrous metal markets.

Meanwhile, industry officials gathered in Denver for the 1948 meeting of the Colorado Mining Association have been advised by leaders in their industries that subsidy payments in peacetime except to aid in creation of adequate permanent stockpiles for national defense are economically unsound. Howard I. Young, president, American Zinc, Lead & Smelting, Co., declared when subsidies were first discontinued his company's low-grade ore properties were unable to continue output. Since that time, however, prices established in the open market have risen to the level where development work has again started and production will begin in a few months. Furthermore, domestic production of copper, lead and zinc during and since the war refute the idea that the country will soon be in the "have not" category with regard to these minerals, he stated.

COPPER—Mine output of copper in 1947 was up 39 per cent over 1946 while smelter and refinery production from domestic materials were up 42 and 58 per cent, respectively, Bureau of Mines states in its preliminary annual report.

Sliding copper and brass scrap prices last week enabled additional brass ingot makers to lower their quotations by a cent to 1¼ cents a pound. In the 85-5-5-5 group No. 115 is quoted 19.00-19.25c in carloads; No. 305 in the 80-10-10 group is 24.25c; No. 215 in the 88-10-2 group is 28.00c; and No. 405 yellow ingot lists from 15.00 to 16.00c.

Electrolytic copper, delivered Connecticut Valley, was steady last week at 21.50c.

LEAD—Domestic mine production of lead in 1947 was 12 per cent higher at 375,267 short tons than in 1946, but except for that year was the lowest since 1938, according to the Bureau of Mines in its preliminary annual report. End of the Premium Price Plan in mid-1947 was reported to have had little effect on overall output, although some lead-zinc mines which derived sustantial revenue in the form of premiums were forced to close.

Available lead supplies for February are now about 90 per cent accounted for by known customer requirements and needs for March represent about 30 per cent of available supply in that month.

ZINC—A gain of 9 per cent over 1946 mine production of recoverable zinc was recorded in 1947 when 624,809 short tons were mined, according to the Bureau of Mines. Production in the combined western states rose 22 per cent over the previous year to the highest level on record.

Smelter production in January held steady at 71,505 tons, American Zinc Institute reports, but increases in domestic shipments to the largest volume since last March, coupled with higher exports and transferal of 10,156 tons to the permanent government stockpile, reduced industry stocks at the end of last month to the lowest figure—55,085 tons—since September, 1942. Unfilled orders during the month rose sharply to 67,562 tons, the highest since January, 1943.

Price of Prime Western, E. St. Louis, remains unchanged.

TIN—Offerings of Malayan tin are reportedly being withheld at the source in anticipation of a further rise in price. Straits tin, which prewar commanded a premium over Standard tin is once more regaining its traditional quality and the premium may again be required. Such an advance would necessitate higher American prices on Bolivian tin as well, its price being tied to the New York cif equivalent of Straits tin.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.00-19.25c; 88-10-2 (No. 215) 28.00c; 80-10-10 (No. 305) 24.25c; No. 1 yellow (No. 405) 15.00-16.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, E. St. Louis; high grade 13.00c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.50-16.75; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.50-17.00c; grade 2 (92-95%) 16.00-16.50c; grade 3 (90-92%) 15.75-16.00c; grade 4 (85-90%) 15.25-15.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 to 4000 lb, 35.00-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (including Straits), 94.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 93.85c; Grade C, 99.65-99.79% incl. 93.50c; 99.00-99.64% 93.50c and 98.00-98.99%, 92.60c for tin content.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 33.75c lb; 25 lb pigs produced from electrolytic cathodes 35.25c lb; shot produced from electrolytic cathodes 36.25c lb; "F" nickel shots or ingots for addition to cast iron 34.25c lb. Prices include import duty.

Mercury: Open market, spot, New York, $77-$79 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 74.62½c. per ounce.

Platinum: $69-$72 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c; best quality 30.78c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c; best quality brass 33.50c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.80c, less carlots 27.30c; weatherproof, fob eastern mills, carlots 27.35c, less carlots 27.85c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu; 50 lb bags, 25.00c fob Cleveland.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb bbls, 21.50c.

Tin Anodes: Bar, 1000 lb and over 110.00c; 500 to 1000 lb, 110.50c; 200 to 5000 lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 1000 lb, 112.75c; 200 to 500 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ½c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper 16.00, composition red brass 14.50, auto radiators 11.00, heavy yellow brass 10.50, brass pipe 11.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.25, No. 2 copper 17.25, light copper, 16.50, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.00-16.50, No. 2 15.00-15.50, light copper 14.00-14.25, No. 1 composition red brass 12.00-12.25, No. 1 composition turnings 11.50-12.00, mixed brass turnings 7.75-8.25, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.25-6.75, heavy yellow brass 8.75-9.00, new brass rod ends 10.50-11.00, auto radiators, unsweated 9.50-10.00, cocks and faucets 10.00-10.25, brass pipe 9.50-9.75.

Lead: Heavy 12.00-12.50, battery plates 7.00-7.25, linotype and stereotype 14.50-15.00, electrotype 12.00-12.50, mixed babbitt 13.50-14.00, solder joints 16.50-17.00.

Zinc: Old zinc 5.50-5.75; new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 45.00-47.00, No. 1 babbitt 45.00-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings, 2S 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, borings and turnings 2.50-3.00, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Jan. 1-20	21.50	14.80–14.85	10.50	94.00	15.00	33.00	33.75	74.625
Jan. 21-31 ...	21.50	14.80–14.85	12.00	94.00	15.00	33.00	33.75	74.625
Feb. 2-12	21.50	14.80–14.85	12.00	94.00	15.00	33.00	33.75	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.50
No. 2 Heavy Melt. Steel	40.50
No. 1 Busheling	40.50
Nos. 1, 2 and 3 Bundles	40.50
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	37.50-38.50
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	59.00-60.00
Charging Box Cast	45.00-47.00
Heavy Breakable Cast.	46.00-47.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	69.00-70.00
Axles	51.50-52.00
Rails, Rerolling	54.00-55.00
Rails, Random Lengths	52.50-53.00
Rails, 3 ft and under	56.00-56.50
Rails, 18 in. and under	57.00-57.50
Railroad Specialties	55.00-56.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	52.00-53.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	70.00-72.00
Charging Box Cast	60.00-62.00
Stove Plate	60.00-62.00
Heavy Breakable Cast.	56.00-58.00
Unstripped Motor Blocks	60.00-62.00
Malleable	75.00-80.00
Brake Shoes	54.00-55.00
Clean Auto Cast	70.00-72.00
No. 1 Wheels	60.00-62.00
Burnt Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	70.00-75.00
Rails, Rerolling	60.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	63.00-65.00
Cast Steel	58.00-60.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	61.00-62.00

* Earmarked material; open market price $47.00-$48.00.

VALLEY

No. 1 Heavy Melt. Steel	40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	47.00-48.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Earmarked for return to steel supplier. Price in open market, $47.00-$48.00.

MANSFIELD

Machine Shop Turnings	35.50-37.50
Short Shovel Turnings.	35.50-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast.	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	68.00
Rails, Rerolling	58.00
Rails, Random Lengths	56.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast.	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.50-44.50
No. 2 Heavy Melt. Steel	39.75-41.00
No. 1 Busheling	39.75-41.00
No. 1 & 2 Bundles	39.75-41.00
Machine Shop Turnings	36.50-37.50
Mixed Borings, Turnings	36.50-37.50
Cast Iron Borings	37.50-38.50
Short Shovel Turnings.	37.50-38.50
Low Phos.	47.00-48.00
Elec. Furnace Bundles.	44.00-45.00

Cast Iron Grades

No. 1 Cupola	62.00-64.00
Mixed Cupola	60.00-62.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	54.00-55.00
Railroad Specialties	55.00-56.00

PHILADELPHIA

No. 1 Hvy. Melt. Steel	$41.50-42.50*
No. 2 Hvy. Melt. Steel	39.00
No. 1 Busheling	39.00
No. 1, No. 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.50-35.50
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings.	36.00
Bar Crop and Plate	46.50-47.00
Punchings & Plate Scrap	46.50-47.00
Cut Structurals	46.50-47.00
Elec. Furnace Bundles.	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	62.00-63.00
No. 1 Machinery Cast.	65.00
Charging Box Cast	59.00
Heavy Breakable Cast.	59.00
Unstripped Motor Blocks	52.00-53.00
Malleable	74.00-76.00
Clean Auto Cast	62.00-63.00
No. 1 Wheels	64.00-65.00

* Nominal.

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03
No. 2 Heavy Melt. Steel	34.03
No. 1 Busheling	34.03
Nos. 1 & 2 Bundles	34.03
No. 3 Bundles	32.03
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings.	30.50-31.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles.	40.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-58.00
Charging Box Cast	55.00-58.00
Heavy Breakable	55.00-58.00
Unstripped Motor Blocks	52.00-54.00
Malleable	65.00-68.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	31.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings.	30.00-31.00
Bar Crops and Plate.	38.00-40.00
Punchings & Plate Scrap	33.00-34.00
Chemical Borings	32.00-33.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-60.00
Heavy Breakable Cast.	50.00-52.00
Stove Plate	46.00-47.00
Unstripped Motor Blocks	45.00-46.00
Clean Auto Cast	48.00-49.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
Nos. 1 & 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	45.00-45.50
Punchings	50.00-50.50
Elec. Furnace Bundles.	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	65.00-67.00
Clean Auto Cast	62.00-65.00
No. 1 Wheels	53.00-56.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.50-45.00
Malleable	73.00-74.00
Rails, Rerolling	54.50-55.00
Rails, Random Lengths	53.00-54.00
Rails, 3 ft and under.	59.00-60.00
Rails, 18 in. and under	61.00-62.00
Railroad Specialties	53.00-54.00
Angles, Splice Bars	58.00-59.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings.	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	60.00-65.00
Mixed Cast	60.00-62.00
Heavy Breakable Cast.	53.00-55.00
Brake Shoes	54.00-55.00
Clean Auto Cast	64.00-66.00
Burnt Cast	58.00-59.00

Railroad Scrap

R.R. Malleable	65.00-70.00
Rails, Rerolling	54.00-55.00
Rails, Random Lengths	52.00-53.00
Rails, 3 ft and under	57.00-60.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-49.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	35.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	36.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.50-15.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-43.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

LOGEMANN

Presses for Sheet Scrap

THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service,* presses *designed for automobile plant conditions,* presses *designed for general plant applications.* Write for details.

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.

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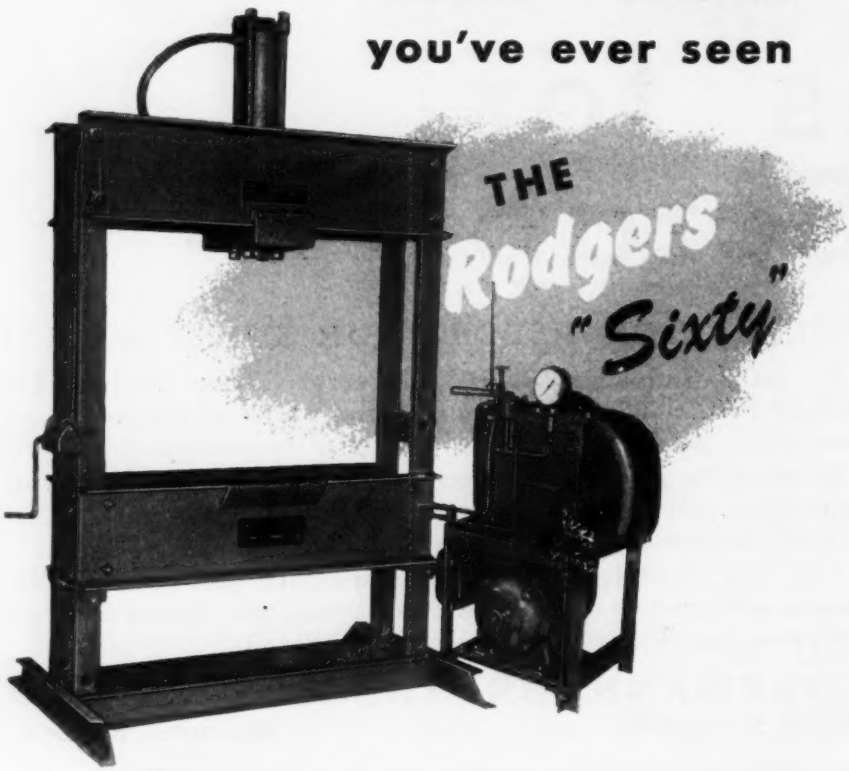
The most *Versatile, Practical* SHOP PRESS you've ever seen

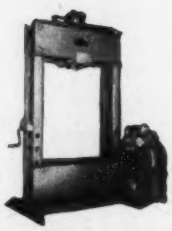


BEHIND the label—Rodgers "Sixty" 60 Ton Shop Press with power driven hydraulic pump—is a flexible, highly efficient production unit that will prove invaluable in taking care of those many miscellaneous time and labor consuming jobs. Powered with the Rodgers "D" pump and newly-designed four-way valve, it has all of the desirable features of a streamlined press for general shop use where pressures up to sixty tons are required.

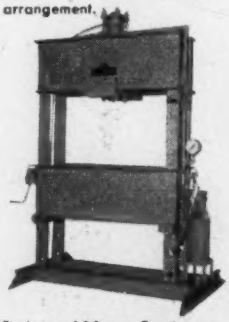
Outstanding features include: An 8" opening between columns permitting long work to be slid through either end of press without obstruction; ram and cylinder may be moved into various positions on the press without changing placement of work; bottom bolster can be raised or lowered easily with a hand crank; and V-blocks for innumerable uses in any position on the bolster. Power pumps are available with or without four-way valve—and in manual or solenoid control.

The "Sixty" is but one of the Rodgers series. Standard shop presses are available in 100, 150 and 200 ton sizes, with 300 and 400 tons capacity presses made to order. All include the same proved Rodgers design and performance features. All are rugged, durable, flexible and versatile.

There is a Rodgers Shop Press exactly suited to your needs in any tough service and maintenance work in pressing, squeezing and forcing. Prompt delivery on standard models.



Rodgers 150 ton Stationary Shop Press with hydraulic "D" pump and four-way valve arrangement.



Rodgers 100 ton Stationary Shop Press with 4-speed, hand-operated hydraulic pump.

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Shop Presses

Crawler-Track Presses

Rodgers Hydraulic, Inc.

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7423 Walker St., St. Louis Park, Minneapolis 16, Minn.

Power Pump Units

Portable Presses

Sheets, Strip . . .

Little change in pressure for flat-rolled. Easing in electrical sheets expected

Sheet Prices, Page 138

Cleveland — Possibility that demand for electrical sheets may ease soon was seen last week with recent announcement of production cutbacks by at least two electric motor manufacturers. However, electrical sheet producers say they have thus far noticed no decline in pressure for this product and point out that inasmuch as demand has been so far ahead of supply any moderate easing in orders would still leave demand ahead of output. One producer said it anticipated no leveling out of demand until the third or fourth quarter of this year. The supply of this product was upset somewhat by the recent acquisition by Studebaker Corp. of Empire Steel Corp., Mansfield, O., an important producer of electrical sheets.

However, there have been some indications that other motor manufacturers and producers of motor-operated appliances are exercising increasing caution in purchasing and production schedules.

Imbalance of the supply and demand status of flat-rolled carbon products appeared to be aggravated further last week by industrial gas curtailments necessitated by severely cold weather. One company, using a monthly quota system on orders, indicated that quotas for one of the coming months may have to be reduced to permit production to catch up with orders booked. Cold-rolled carbon strip is reported to be in increasingly strong demand, while hot-rolled strip remains in tight supply, with the hot-rolled sheet supply being tightest of all.

To conform with technical standards established and recommended in Section 12 of the Steel Products Manual of American Iron & Steel Institute, Republic Steel Corp., Cleveland, is issuing a new extra card on hot-rolled carbon strip. Effective Feb. 16, the new card supersedes the list issued Nov. 1, 1947, and provides for special soundness quality.

Pittsburgh — Sheet and strip output has been well sustained despite critical industrial gas shortage, which has intermittently interrupted production of most finished steel items. Sellers see no significant improvement in present tight supply-demand situation in flat-rolled steel until late this year. In very few instances have consumer inventory pipelines been filled, and among the great majority of customers present production schedules continue restricted. New sheet and strip mills, plus a number of mill speed-up programs, are expected to increase the industry's maximum potential capacity materially; however, it is questionable to what extent raw material supply will permit full utilization of flat-rolled steel finishing facilities over coming months.

Chicago — Sheet and strip producers report no diminution in demand; in fact, consumers state they are obliged to cut manufacturing schedules for lack of material. Currently, gas shortages have forced the

automobile and other industries in eastern centers to shut down or drastically curtail operations., but nowhere has there been a disposition for those affected to ease their pressure for full mill shipments against quotas. All are eager to build inventories as much as possible. Coupled with this is a fear that the voluntary allocation plan now being promoted for a few essential industries may force sheet and strip makers to reduce quotas for the less favored industries.

Birmingham — Consumers declare the only news in sheets is bad news. They've been hoping one of two things would happen: that demand would level off (elsewhere, of course) or that some miracle of production would help solve the supply situation. Neither has happened.

St. Louis — Production of hot-rolled sheets for the market has been suspended in the St. Louis area indefinitely with Granite City Steel's completion of its backlogged hot sheet orders. Plate production likewise will be concluded by the end of the quarter. Output thereafter will go into cold rolled products. Crew training difficulties are delaying full operation of the company's new $7 million cold reduction mill, and it has not yet run at more than 15 per cent capacity. At top, the company's annual finished steel output will be 400,000 tons, quadruple the former capacity. Rolling currently is centered on tin plate. Sheet and strip demand here is unabating, with the pressure soon to increase as a result of several temporary production curtailments to conserve fuel during recent severe weather.

Philadelphia—Most sheet sellers have set up quotas for the second quarter, although there are still at least two important interests who have held off, having not even set up allotments for April. This delay is ascribed to difficulties resulting from gas and fuel oil shortages. Sheet consumers generally expect more tonnage in the second quarter than in the current period. They are basing this expectation principally on prospects for better mill operations, once milder weather sets in, and to some extent on the likelihood of larger mill capacity. They believe that these factors will even offset any such dislocations as may arise through the operation of a proposed voluntary priority program.

Boston — Low carbon cold strip prices range from 3.75 cents to 4.45 cents, Worcester base, one producer charging 3.95 cents which includes drawing extra. Demand for cold strip is heavy, with only a slight easing in pressure here and there, including shank steel. Inventories of strip for processing have narrowed to the point one Pittsburgh producer is supplying a substantial ratio of New England tonnage. There is continued lack of balance in cold reducers' inventories which portends considerable rescheduling in the second quarter. The shortage of sheets is not helped by partial withdrawals by some mills from this territory. Several are selling only specialties. Substitutions for enameling grades are widespread, notably among stove and range builders, now utilizing cold rolled. For oven stock some are using aluminized steel sheets. Several producers have no hot-rolled carbon sheets available

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handle the tough jobs

"HARD-DUR" Gears preserve the tooth form because they are made of the finest gear steels and are scientifically heat treated. They are so much more wear-resistant than similar untreated gears that they are guaranteed to have four to five times the life and at only 50% extra in cost. Harder tasks on which ordinary gears fail become easier with Horsburgh & Scott "HARD-DUR" Gears.

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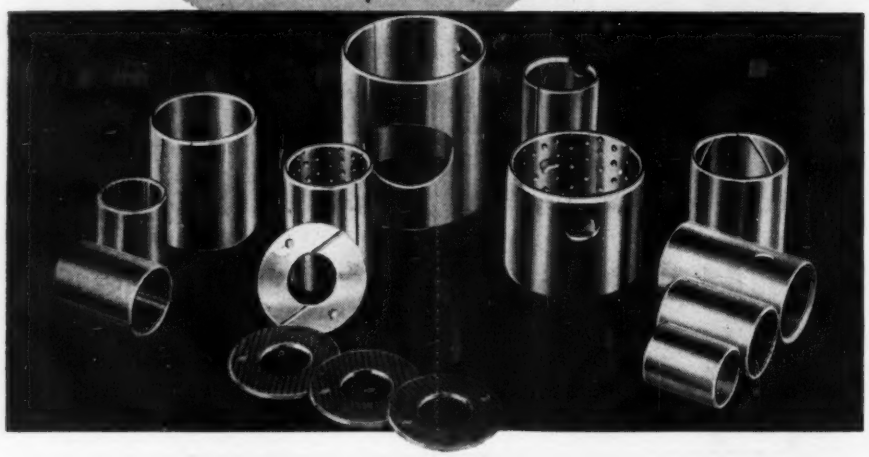

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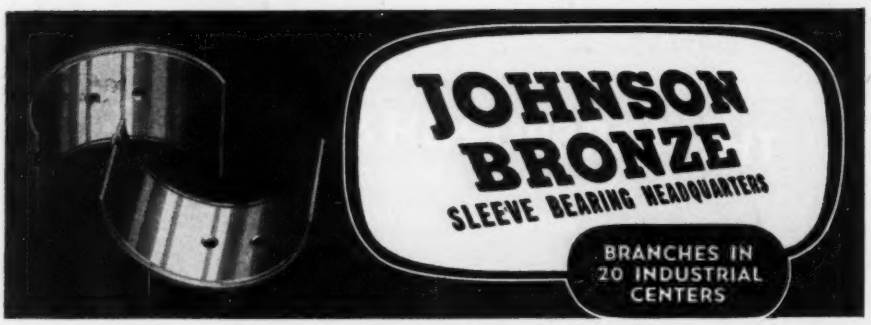

over the next few weeks and have limited cold-rolled allocations.

New York — Disruptions to production, due to gas and fuel oil shortages in particular, will result in substantial arrearages at the end of this quarter, sheet producers claim. However, most have gone ahead with their plans for establishing quotas for second quarter, at least on a tentative basis. Some producers state that the first month (April) will be devoted entirely to catching up on arrearages and believe that before the first quarter is over they will find it necessary to add at least another couple of weeks for catching up, with a resultant revision in the quotas they now are establishing.

Moreover, there is a possibility the voluntary allotment program will result in some adjustments; however, there is not quite the concern about that that there was recently, as some sellers believe considerable time will be required in setting up these allocations and that details may not be worked out until well into second quarter, if then.

Belgian Sheets Offered

New York — Belgian hot-rolled black sheets, mild steel quality, are being offered in this market by importers at the following prices:

Gage	per 100 lbs.
14-16	$10.89
18	11.11
20	11.34
22	12.02
24	12.48
26	12.93
28	13.38
30	14.52

These prices are fob Antwerp. To them must be added the freight to New York amounting to 47 cents per 100 lbs, insurance of 35 cents per 100 lbs, and the import duty of 10 per cent. The total figures out at about the levels quoted on sheets in the "gray" market.

In addition to sheets importers are also offering angles in light sizes 1/2-in. to 2 in. and up to 3/16-in. in thickness as well as window sash sections.

Tin Plate . . .

Tin Plate Prices, Page 139

Washington — Licenses authorizing exportation of waste tinplate, strips, rings and circles (Schedule B Nos. 601300-601400) will be issued with a validity period of 90 days from the date of validation, effective Feb. 9, Office of International Trade, Department of Commerce, has announced. Licenses issued prior to Dec. 1, 1947, which are still valid will expire on Feb. 29 or on the expiration date indicated on the license, whichever is sooner.

Photostats or certified copies of inspection reports of recognized commercial testing laboratories, certifying the material is as specified in the license, must be presented by the exporter to the Collector of Customs before export clearance can be effected. Producers exporting directly or supplying exporters with this material must submit mill inspection reports to the Collector of Customs, effective Feb. 9.

Steel Bars . . .

Bar Prices, Page 138

New York — While producers of hot carbon bars are setting up quotas for second quarter, most are advising their customers that there may be some reductions later because of the possibility that continued disruptions to output would increase the arrearages that have to be worked off before they would be in position to go ahead with new specifications. In general, producers have tried to discount the continued effects of gas and fuel oil shortages on their operations but already it appears as if some have not made sufficient allowances.

Outlook at the moment is that while production will be potentially better as the weather improves, with actual shipments in the second quarter surpassing those in the first quarter, there will not be any more, if as much, capacity available for handling new specifications.

Cold-drawn bar sellers report a more active demand, although some are having difficulty keeping pace because of inability to get sufficient hot stock. Cold drawers in general continue to book well into the future if the tonnage appears attractive. As a result some have orders scheduled for fourth quarter.

Cleveland—Alloy bar demand, which strengthened several weeks ago, continues to hold. While much of the increased demand has been attributed to the needs of the automotive industry, some of it is believed being used merely as a substitute for the hard-to-get carbon bars. One company reported that alloy bar orders taken now could not with any certainty be delivered before July.

Putting the carbon bar supply farther out of line with demand has been the channeling of a substantial portion of that product into the increased railroad freight car building program.

Philadelphia—Improvement in hot alloy bar specifications has been apparent recently, and one large seller is quoting deliveries at six to eight weeks as compared with around four weeks on an average at the beginning of the year. Some of this betterment is ascribed to the tendency to substitute alloys, where possible, for hot carbon, because of the continued stringency of the latter. However,this is not the complete answer, it is pointed out, as demand for hot alloys appears to be improving in its own right. Cold alloy bar deliveries, though, show little change at around three to five weeks. Cold-drawn carbon bars, especially flats and small rounds, are in good demand, with shipments well extended.

Boston — Demand for alloys has improved without straining producer ability to meet the increase. Among bars only hot-rolled remain in critical supply, and, in these, pressure is centered more in certain sizes and grades, notably flats, bar angles and shapes. Merchant quality stock appears in better shape than quality grades. Tool and soft steel stock is ample for current demand; buying by forge shops is spotty, there being some slackening in forgings for trucks without affecting general automotive volume.

Chicago — The bar situation close-

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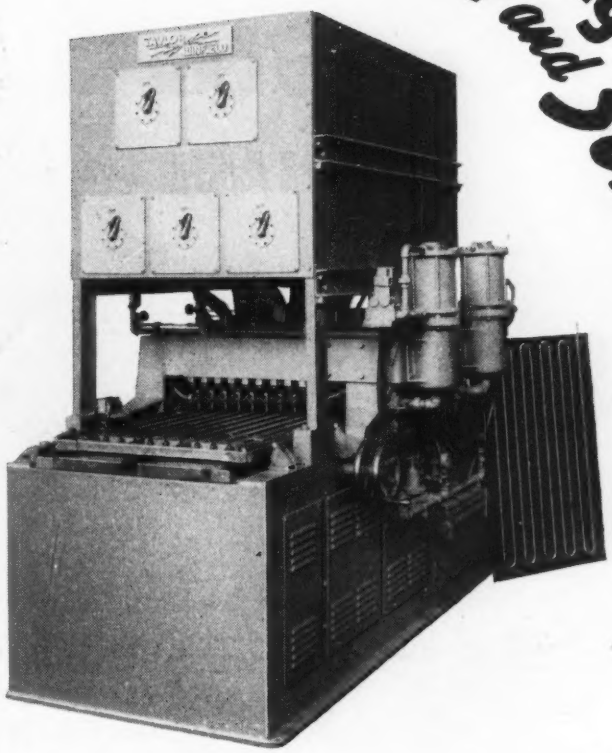
only Resistance Welding can do this job FAST and SURE



32,400 WELDS PER HOUR

(54 ASSEMBLIES) ON THIS T-W Multi-Spot WELDER

THE PRODUCT—Condenser for domestic refrigerator.

THE PROBLEM — How to join, on a production basis, an assembly consisting of multiple "S" formed tubing and flat sheet.

THE PROCEDURE—Resistance Welding. An operator loads the tubing on table, then he places a flat sheet on top of the tubing. A press of the button and the T-W welder automatically takes over, making 600 spot welds in each assembly.

RESULTS — 32,400 welds every hour (54 assemblies).

COMMENT — Results like the above are not unusual with resistance welding. Ask Taylor-Winfield how your production can be speeded with this fast, fabrication method.

The "Weld-It" shows many production short cuts with resistance welding. Request the "Weld-It" on your letterhead.

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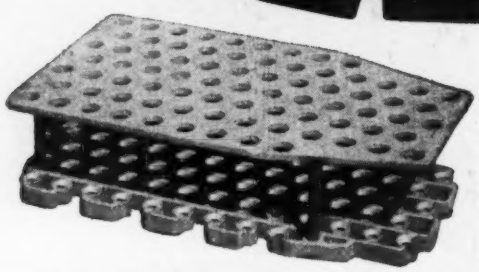
TAYLOR-WINFIELD
RESISTANCE WELDERS



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ALLOY CASTINGS

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ly parallels sheets and strip insofar as shortage is concerned. Demand for carbon bars exceeds supply by a substantial margin—large sizes as well as small—and even alloys are much tighter than they were a few months ago. Drop forgers appear to be increasing their activity and are seeking more tonnage than they have been getting. Total requirements for carbon and alloy grades exceed mill quotas by a good margin. Bar users fear that whatever is worked out in the way of voluntary allocation plans for a few essential industries can result only in reduced quotas for the average consumer.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 138

Boston — Contracts for concrete reinforcing bars are slightly more numerous, but with distributors' allocations limited, buyers are still forced to shop around to place orders; inquiry is up slightly. The price structure on reinforcing bars is firm but demand for steel for other products limits bar output which is under demand.

Seattle — Rolling mills are operating steadily at top capacity, yet order backlogs remain static due to the pressure of new orders. Large tonnages are not numerous but the volume of small jobs of less than 100 tons each is of major proportions. Schools, industrial and commercial construction account for this strong demand for reinforcing bars while public works are also absorbing heavy tonnages.

Tubular Goods . . .

Tubular Goods Prices, Page 139

Cleveland — Reflecting the recent rise in price of zinc, the price of galvanized pipe was increased $3 a ton effective Jan. 30 by Republic Steel Corp.

Demand for pipe shows no easing, with production meanwhile being hampered by industrial gas curtailments during severely cold weather. One producer which has not yet opened its books for orders for standard steel pipe for April delivery said that any continuation of the weather-enforced gas curtailments might make it necessary to take no orders for April, leaving that month for completing orders scheduled for previous delivery.

New York—Socony - Vacuum Oil Co. plans to start construction in May on a 125-mile 6-in. pipe line from South Portland, Me., to Bangor. About 60 days will be required to complete the project.

Seattle — Cast iron pipe demand is dull, agencies being handicapped by slow mill deliveries. No large tonnages are up for bids. Portland has awarded 695 tons assorted sizes as follows: 500 tons to H. G. Purcell, Seattle, 195 tons to American Cast Iron Pipe Co. and Pacific States Pipe Co. Purcell has also booked 64 tons for Tumwater, Wash. Portland will open bids Feb. 17 for unstated tonnage of cast iron pipe, 5000 ft 4, 6 and 8 in. and accessories for a treatment plant, Grand Coulee, Wash.; Margaret E. Lytle, city clerk, will open bids Feb. 17 for 3,200 ft cast iron water pipe, and fittings.

Plates . . .

Many mills will enter second quarter with heavy carryovers as result of gas cutoff

Plate Prices, Page 139

Boston — Although one month has generally been blanked out, plate mills are not making progress against order backlogs hoped for because of production losses and will enter the second quarter well loaded with carryovers in numerous instances. Plate shop inventories are lower, reflecting slackening in deliveries of late. Weldment shops are also in this position and are pressing for tonnage more urgently. While backlogs with weldment shops are still substantial, they are building up less steadily. Old established customer relationships in the distribution of plates are badly disrupted by price differences and selective selling. Fuel oil shortages are adversely affecting new installations of 275-gal. tanks, but the need for greater bulk storage in the New England area is apparent. This is recognized in plans to increase Socony-Vacuum Oil Co.'s storage at Worcester from 2.5 million to 5.5 million gallons.

One eastern plate mill is to enter the fabricated pipe field, producing 24 and 30 inch. This follows a trend among smaller independent mills toward the fabrication of finished steel products from their own or affiliated steel output.

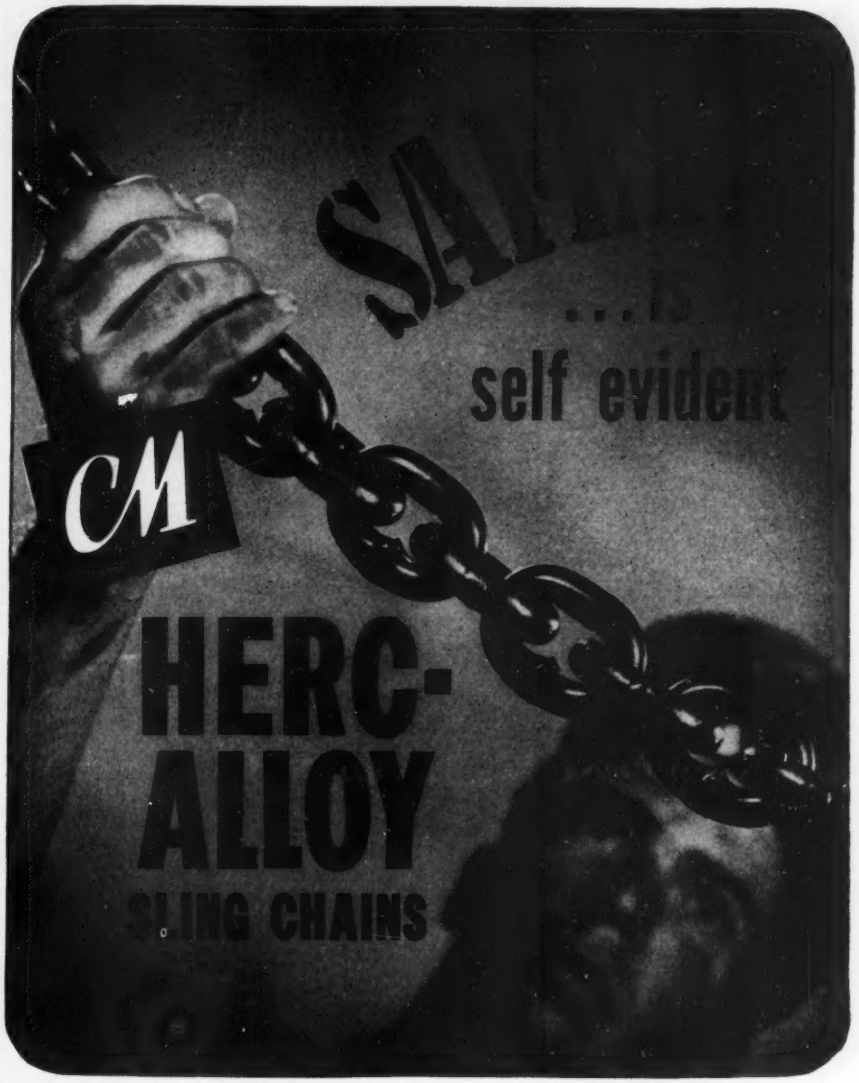
New York — Most plate sellers have announced quotas for second quarter, with allotments applying to their regular customers. Production next period is expected to be heavier because mills will not be confronted with the seasonal shortages of gas and fuel oil and, in fact, will probably be receiving scrap and pig iron on a somewhat better basis; however, they will all have substantial carryovers because of disrupted operations.

Philadelphia—Plate producers report continued heavy demand, and while most have opened their books for second quarter, they are having to turn down considerable tonnage for that position. Operating difficulties, due to shortages of raw materials, indicate a fairly substantial carryover at the end of this quarter.

Cleveland — Cleveland has been named by Jones & Laughlin Steel Corp., Pittsburgh, as a basing point for floor plate. Heretofore, Pittsburgh and Chicago were used by the company as basing points for that product, but in recognition of production of that item at Cleveland that city too has been added as a basing point. The price base at Cleveland is the same as at Pittsburgh and Chicago, 4.20c.

Floor plate is reported in increasing demand. While much of that product is going into the floor and safety applications for which it was designed, the difficulty of procuring ordinary carbon steel plates has resulted in the substitution of some floor plate, a premium price item, for fabrication of tanks, the anti-slip treads being turned to the inside. One factor contributing to the good demand in this district for floor plate is said to be the new General Motors Corp. plant under construction here.

Birmingham — Supply situation in



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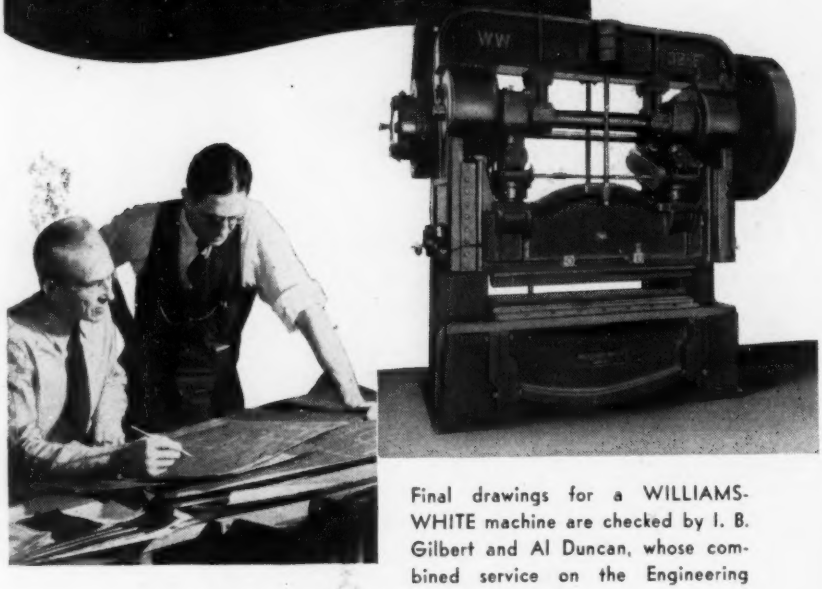

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plates, while hardly as tight as that in sheets, probably is the district's second major steel worry. On top of the already marked shortage is the fact diversion of considerable tonnage to the new tube mill at Gadsden is scheduled probably for March.

Seattle — Plate fabricators report increasing scarcity in plates which some state are as critical as sheets. For this reason, plants are confining operations to jobs involving small tonnages. Tank and boiler work on small contracts are sufficient to maintain steady operations. Hydraulic Supply Mfg. Co., Seattle, is low at $8,698 for erection of a water tank for Seattle. Denver called bids Feb. 12 for penstock and discharge pipe, Roza division, and Mar. 2 for chute and siphon, Sweetwater canal, Idaho, tonnages unstated. Bids are in to bureau for cement storage plant, at Odair, Wash.; Mullin & Sander, Moses Lake, low $22,941.

Wire . . .

Wire Prices, Page 139

Chicago—A few merchant products continue as the tightest of all wire items. Heading the list is nails, and in some locations the shortage is critical. Jobbers and distributors constantly exert strong pressure for first-quarter deliveries. With spring not far away, demand for barbed wire and all kinds of fence is at very high level. No let-up can be detected in demand for manufacturers wire.

Boston — Ability to obtain semi-finished to meet finishing schedules is of increasing concern to wire mills. Rod supply continues limited, notably in low carbon and cold-heading stock. Among finished wire products, cold-heading wire continues critical particularly in the intermediate sizes. In finishing and processing, polishing and tempering equipment is heavily taxed. Wire mills are scheduling for second quarter with indications carryovers in some high carbon specialties will be substantial.

Birmingham — Steel interests report minimum loss of tonnage in wire, along with other products, as a result of the continued cold weather and resultant gas shortage, but the hue and cry for wire is intensified. Hope had been expressed that some of the slack would have been taken up by the time agricultural demand hit full sway again. But that day is not far off, and supplies in every category are as scarce as ever.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 139

Pittsburgh — Output of fasteners has been adversely affected by the industrial gas shortage, although the situation has been alleviated somewhat by fuel oil standby equipment. Sellers report further extension of order backlogs in recent weeks, reflecting retarded production and continued heavy influx of new orders. Most producers state deliveries are extended an average of 4 to 5 months, with some items not available until late this year. Mill receipts of wire rods, cold-heading stock and other wire items has also been interrupted, a situation which is expected to result in an adjustment in second quarter quotas to nut and bolt producers.

Structural Shapes . . .

Structural Shape Prices, Page 139

Pittsburgh — New inquiries for shapes and plates have not followed normal seasonal pattern, with steel tonnage involved in new projects recording little change in recent months. Sellers have established second quarter production schedules, subject to later revision to make up for carryover tonnage currently being lost due to industrial gas shortage.

In addition to increased tonnage required under the voluntary freight car allotment program, the steel industry has agreed to ship 35,000 tons monthly (involving semifinished and finished steel) for Greek rehabilitation. These shipments are expected to be inserted in March production schedules.

Boston — Structural steel fabricating shops have comfortable backlogs, although most new contracts tend to be awarded on a delivery basis. Although plain material requirements are being met, some delays are due to shortages of fill-in sizes. Fabricating and erecting costs are high, but most work contemplated is going ahead; for small bridge erection $44 a ton was recently asked. Bids on the Mystic river bridge superstructure, 37,000 tons, are again postponed to Feb. 26.

Philadelphia—While little outstanding tonnage has been placed in the district recently, a fairly good volume of structural business is active, including 900 tons for an office and warehouse for American Stores Co., Philadelphia, on which bids have just been closed.

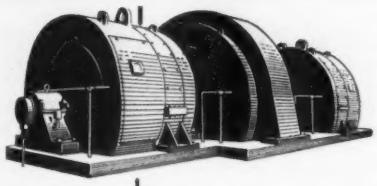
Seattle — Fabricators report demand for shapes is still in seasonal eclipse, no tonnages of importance being up for figures. Backlogs are rather large but plant operations are tapering off as supplies of certain sections are exhausted. Decreased mill allocations are seriously affecting fabricators in this area so that they prefer small jobs to larger ones involving commitments beyond current inventories.

Warehouse . . .

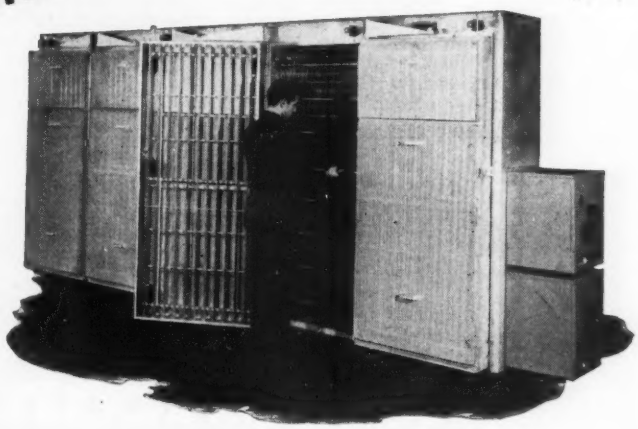
Warehouse Prices, Page 141

Chicago — With manufacturers of most metal products seeking to increase operations and unable to satisfy their requirements of finished steel products from mill connections, warehouses are called upon constantly for all tonnage that can be supplied. Stock position of the latter is uncomfortable, for material is dispatched to consumers as rapidly as it arrives from mills. The extreme shortage of flat-rolled products has caused considerable substitution of aluminum, with the result that the latter material is not available in quantity. One interest supplying aluminum has had its sheet quota reduced 50 per cent.

Cincinnati — Steel stocks at warehouses are lower than 60 days ago, the sales volume having been maintained at expense of inventory. Some interests report increase in inquiries from buyers in other districts. Warehousemen fear shipments the rest of this month will reflect the recent lowered mill production.



Where clean air returns a cool profit



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Pig Iron . . .

Pig Iron Prices, Page 140

Boston — Movement of Mystic iron production to foundry consumers is a major problem. Output has been somewhat ahead of hampered deliveries with some accumulation of tonnage at the Everett furnace. With few exceptions foundry iron reserves are down to a hand-to-mouth basis. From Buffalo deliveries are limited to silvery and specialties. Texas iron is reported at $75, Daingerfield, with some contracts outstanding in the East, although few, if any in New England. This means foundry iron around $92, delivered in the Albany district. Foundries are melting high scrap ratios, but with cupola cast near $20 a ton over iron, costs are badly out of balance. Users of basic are hard pressed with output suffering through uneven operations.

New York — Severe weather conditions are retarding pig iron shipments into this district, with a result that some interests now look for the foundry melt to be off this month on a daily basis, especially with weather affecting movement of scrap as well as pig iron.

Clarifying recent reports of Swedish offerings in this country, this iron tonnage, offered at around $80, is low in silicon and high in manganese, and is said to be from Baltic countries other than Sweden, whereas the charcoal iron offered at $110 is from Sweden itself.

Philadelphia—One leading district pipe mill closed down recently for a period of two weeks because of inability to obtain sufficient pig iron and scrap. The company expects to be able to resume operations on Feb. 23. By that time it is hoped it will have received sufficient supplies to operate at least on a part-time basis. Various foundries also are having operating difficulties but for the most part have been able to maintain production for at least a few days each week. In general, the scarcity of pig iron has never appeared to be more acute, what with Buffalo and southern suppliers of iron having practically withdrawn from the market here for the time being at least and with the stringency resulting for restricted production in this district. In view of the continued cold weather, coke is becoming increasingly scarce. Some foundries regard coke as even a greater chokepoint than metallics.

Pittsburgh — Many foundries have been forced to curtail operations because of industrial gas shortage, and some have been able to maintain reduced operating schedules only through use of fuel oil standby equipment. Fuel oil supply has also become very tight in recent weeks, however.

Intermittent foundry operations have brought about a slight temporary easing in critically tight pig iron, coke and cast scrap, but no significant improvement in overall supply of all three items is indicated throughout most of this year.

Carnegie-Illinois Steel Corp. has blown out its No. 7 blast furnace at the Edgar Thomson Works for relining, leaving 45 out of 47 units pouring iron here.

No decision has yet been announced as to what percentage, if any, of Pittsburgh Steel Co.'s Monessen, Pa., blast furnace output will be made available to the foundry trade. The 1200-ton unit is expected to be ready for pouring iron in June or July.

Cleveland — Pig iron production at Republic Steel Corp. here was affected only slightly when oil on the Cuyahoga river became ignited recently and threatened part of the adjacent industrial area. One of the effects at Republic was a temporary disruption of rail traffic between the company's properties separated by the river.

Republic's pig iron prices at Cleveland and Buffalo, geared at both places to the price of No. 1 heavy melting steel scrap, remained unchanged last week.

Chicago — Indications are iron production in this district has now reached its low point and from here on will turn upward on a moderate scale. Of the available 41 blast furnaces, 38 are operating. Around midmonth, Interlake Iron Corp. expects to relight its "B" stack at South Chicago, down two months for relining. Wisconsin Steel Co. has tentatively deferred blowing out one of its three South Chicago stacks for relining from Feb. 15 to Mar. 1. Some time after Mar. 15 Carnegie-Illinois Steel Corp. plans to light for the first time two large new furnaces at its South Chicago plant. Meanwhile, foundries are suffering from iron shortage, gearing melts to receipts. Scrap continues high priced and short and does not completely make up for

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iron deficiency. However, there is a feeling that the worst may be over.

Buffalo — Zero weather conditions added to the grief of foundries that were pleading for pig iron last week. Transportation facilities became snarled and iron shipments were delayed. Foundries also complain about mounting costs for materials while their customers show increasing resistance to higher casting prices. Cast scrap continued to soar as foundries were active bidders for light supplies. Cupola prices were up $2 to $4 a ton. Talk of higher ore prices raises another threat of higher foundry costs. Rationing of coke continues. Sellers report no letup in brisk demand.

Blast furnace operations remain at 94 per cent of capacity with only one idle stack.

Cincinnati — Shipments of pig iron have not been seriously affected by continued cold weather, but tonnage coming into the district is far from meeting foundry needs even with maximum use of scrap. Ice is preventing river barge shipments thereby tightening up on supplies of byproduct coke.

Birmingham — Pig iron users are taking what they can get when they can get it and are timid about asking for more. They are, however, fuming and fretting increasingly over apparently more dismal prospects than ever for meeting their full requirements. This situation applies to all users, but the most outspoken are foundries and pipe plants. They foresee reduced operating schedules extending into the indefinite future.

St. Louis — Pig iron supplies show no signs of improving although steel mill consumers in the district are in no great distress. Efforts to build ground stocks are of course futile but no production curtailments have been reported so far. Foundries continue hard hit. Koppers blast furnaces have held steadily at 1000-ton daily capacity for several months. These furnish the bulk of locally-consumed iron. Buyers from the Birmingham and Chicago districts are reported suffering delivery delays.

Rails, Cars . . .

Track Material Prices, Page 139

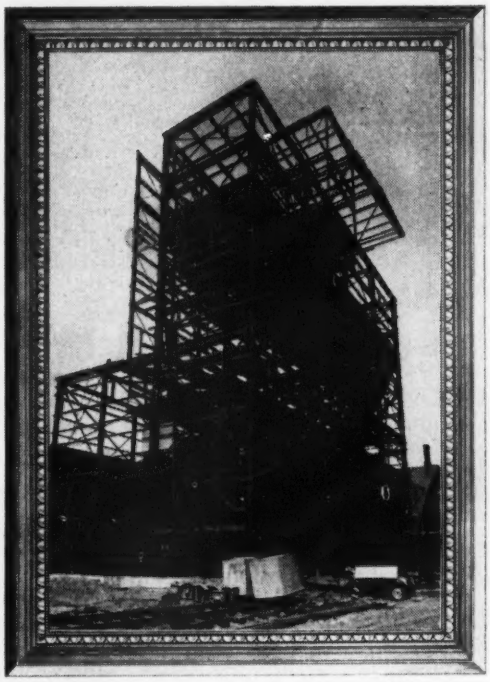
New York — Featuring freight car demand is award of 5000 freight cars by the New York Central to its subsidiary, Despatch Shops Inc., East Rochester, N. Y. The cars are for operation on the lines of the New York Central and its subsidiary, Pittsburgh & Lake Erie.

Adopts New Method of Pricing Sodium Stannate

Change in method of quoting prices of sodium stannate, a plating material, has been announced by Grasselli Chemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del.

Heretofore, prices were quoted on the following bases—Small quantities to all consumers; larger quantities to consumers other than automobile, radio and refigerator makers; and large quantities to automobile, radio and refrigerator makers.

Under the new method, prices are quoted on the bases of only two groups—consumers and resellers.



Rock wool plant for National Gypsum Co., Dover, N. J.

MORE than a MATCH for TIME

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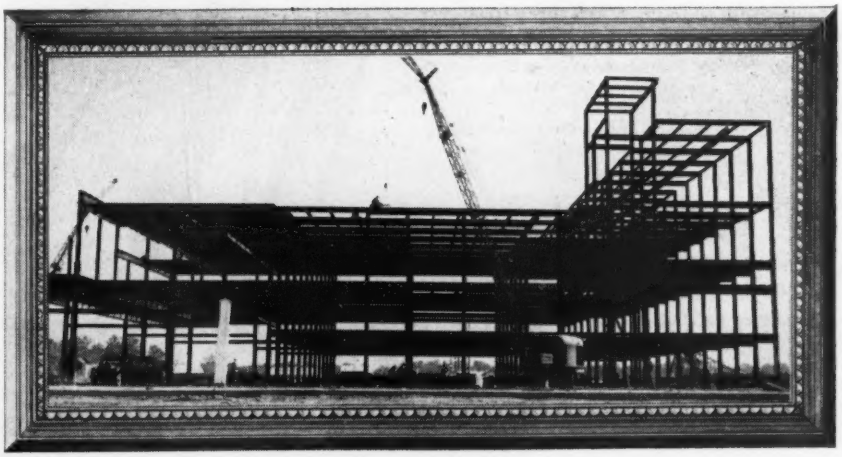
du Pont Nylon plant at Chattanooga, Tenn.



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Scrap...

Large scrap purchase at "formula" price levels hailed as turning point

Scrap Prices, Page 144

Pittsburgh — Ability of a leading producer to place orders within past few weeks for over 200,000 tons of dealer, railroad and reciprocal scrap, for its Pittsburgh and Chicago mills at the "formula" price levels, is believed to herald a turning point in the efforts of the steel industry to stabilize scrap prices. Such a development is said to reflect a combination of factors: Conviction on part of scrap interests that mills intend to hold to "formula" price levels of 100 per cent over OPA ceilings; psychological effect developing out of recent sharp downward trend in commodity and stock prices, which should be first reflected in substantial increase in movement of scrap at the "formula" prices; and indicated substantial increase in scrap supply for the industry as soon as more favorable weather conditions permit greater collection and segregation efforts. Since early December the movement of scrap has been substantially below daily consumption rate, with result mills have been forced to rely on dwindling inventories. Severity of adverse weather conditions in recent weeks is reflected in the surprisingly small scrap tonnage currently moving through dealers' yards, and yards frequently are closed for 24 hours at a time. Industrial scrap supply also has become adversely affected by intermittent operations of many metalworking companies due to industrial gas shortage. Dearth of scrap in dealers' yards, and disruption of operations at many metalworking plants have added increased significance to large tonnage broker-dealer commitments involved in the 200,000-ton purchase.

Cleveland — Purchase recently by Carnegie-Illinois Steel Corp. of 200,000 tons of scrap at no more than the formula price at a time when scrap supplies seasonally are tight was viewed here last week as indication that scrap prices will go no higher, and if they change at all probably will decline.

With advent of winter, there was doubt in some quarters that steelmakers could hold the line at the formula price (approximately double the price existing at expiration of Office of Price Administration regulations). However, most steelmakers, feeling that the formula price was sufficiently high and that in view of the limited supplies of scrap available a higher price would not produce any more scrap, have since last October refused to go above the formula. Meanwhile, steelmakers arranged with their customers to return scrap at the formula price to the mills. When mill inventories of scrap were inadequate for full operations, some mills cut their rate of steel production rather than spring above the formula price for scrap.

The fact that steel mills have without serious difficulty gotten well through the most critical part of the year as far as seasonal scrap procurement problems are concerned has served to remove from the scrap

market any bullishness that might have been predicated on weather conditions. Furthermore, some of the pressure for scrap has been relieved by necessity to reduce steel operations because of winter curtailments of industrial gas supplies.

Also figuring in the conclusion that the formula price probably is the peak for scrap are anticipated increases in receipts of foreign scrap during the coming spring and summer.

Philadelphia—Although No. 1 heavy melting steel is nominally unchanged at around $41.50 to $42.50 delivered, the other major open-hearth grades of scrap have settled to the OPA formula basis which the leading consumers have been striving for. Thus No. 2 heavy melting steel, No. 1 busheling and No. 1 bundles have settled to a flat $39 and No. 3 bundles to $37. Some fair buying at these prices has developed. Meanwhile machine shop turnings have eased to a spread of $34.50 to $35.50, mixed borings and turnings to $34-$35, short shovel turnings to $36 and bar crop and plate, punchings and plate scrap and cut structurals to $46.50 to $47.00. Cast grades are strong, although charging box and heavy breakable are the only grades to have undergone any recent advance. These grades are now up $2 to $59 delivered.

Boston — Little heavy melting steel scrap is being moved at the formula price although in this situation the blockage in transportatian and at yards is a factor temporarily overshadowing price. Some cars got through to yards last week for the first time in days to move tonnage against old orders. Prices for cast grades are rampant although in some cases cupola cast has moved to regular yard customers at prices lower than this grade could be replaced. Foundries supplying castings to the machine tool industry are not operating at capacity in most cases and are not taking much part in the upswing in cast scrap.

New York—Substantial orders for open hearth scrap, particularly by Pittsburgh mills, are being placed here at formula levels, with local brokers covering at $34.03 fob shipping point for Nos. 1 and 2 heavy melting steel, No. 1 busheling, and Nos. 1 and 2 bundles, and $32.03 for No. 3 bundles, the same as have been offered here recently. Brokers have advanced buying prices on machine shop turnings and mixed boring and turnings to a spread of $29 to $30, and on No. 1 cupola cast, charging box and heavy breakable cast to $55 to $58 and on unstripped motor blocks to $52 to $54.

Buffalo — Despite mills' limited stockpiles, a more cautious attitude has been noted among scrap dealers over future price movements. Sliding commodity markets have at least a sentimental effect on scrap prices. In addition mills, in some instances, have adopted more rigid inspection policies. If scrap does reflect the trend in other commodities, no pronounced change is expected until the weather moderates and supplies increase. Two of the three leading mill consumers in this area are working off scant reserve stocks and depend on current shipments to maintain operations.

Confusion dominates the markets in turnings where price spreads range up to $5. Consumers endeavor to hold turnings at the pricing formula, but sales are reported at levels considerably higher.

Detroit—Weakness of the scrap market in Chicago and in the East is reflected sentimentally here and the feeling is that prices have definitely settled to the so-called "formula" basis. Electric furnace material, except for old orders, is now moving at $5 over the open-hearth price, making the local figure $40 to $40.50, off $1 per ton.

Cincinnati — Steelmaking grades of iron and steel scrap are holding at the formula price, with a softness in the market attributed to sentiment created by recent drop in some foodstuffs. Brokers and dealers show a cautious attitude, and nature of offerings means considerable tonnage held on speculation is now being released. Although foundry grades are unchanged, melters are disinclined to meet peak demands. Movement of scrap is still hampered by unfavorable weather, but mills are fairly well stocked.

Birmingham — Near stagnation is reported in scrap locally. In the first place, weather conditions have all but paralyzed activities on local yards. In the second place, definite buyer resistance is noted as far as prices are concerned. Melting steel moves sporadically at any and all but quoted

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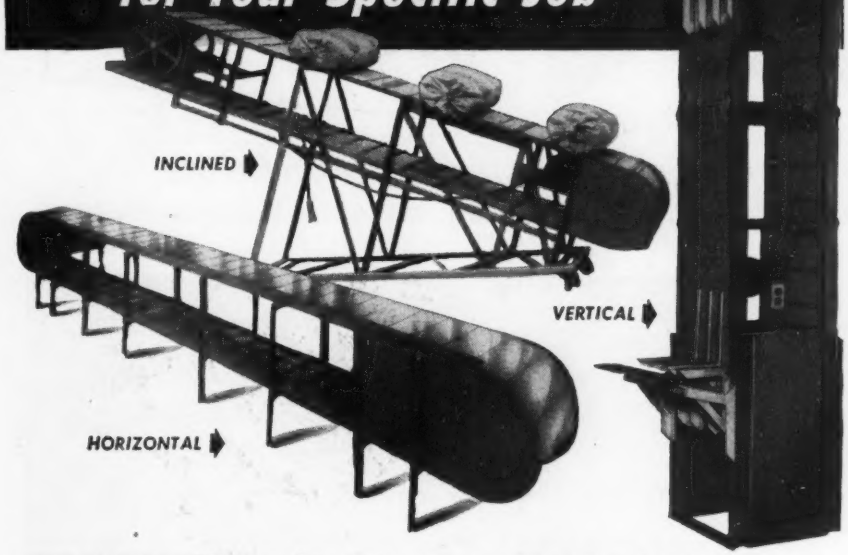

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prices, according to some observers here.

St. Louis — Despite continued severe weather, scrap shipments to this district are improving slightly. Granite City Steel Co., which shut down eight of its 13 open hearths two weeks ago because of dangerously low scrap piles, has since put two back in operation on receipt of moderately better tonnage. Extreme cold has tended to cut shipments more sharply than usual seasonal declines, but an offsetting factor is rising prices.

Seattle — The shipbreaking industry in the North Pacific area is strongly protesting withdrawal of sale involving 160 LTS vessels, most of them on this coast, and totaling 175,000 tons of scrap. Washington officials have not indicated the reason for this action or whether new bids will be called. This potential source was expected to carry mills through the immediate future. Scrap is arriving in tonnages about equal to consumption but with no margin of safety.

Foundries are facing a critical supply situation with both pig iron and cast iron scrap extremely short. Supplies of pig iron are far below demand, thus throwing an additional burden on suppliers of scrap. The price of the latter has been advanced from $30 to $35 and this incentive is expected to bring larger tonnages to tidewater. The immediate reason for this increase was the invasion of Eastern buyers who outbid local interests and shipped a quantity of Coast scrap to the midwest, paying $20 freight, in competition with the Eastern market at $75.

Refractories . . .

Refractories Prices, Page 140

Pittsburgh — Combination of exceptional demand and retarded output due to industrial gas shortage has forced further extension of delivery dates for most refractory brick items. Delay in shipments also is reported by some interests because of freight car shortage. Some sellers' order backlogs for silica coke oven special shape bricks are extended into next year. However, first and second quality clay brick still can be obtained from stock. No let up in pressure for delivery of coke oven refractories is indicated for months ahead. Many coke ovens and blast furnaces are overdue for relining, and the industry is in the midst of a substantial by-product coke oven expansion program. Nearly all major producers in the Pittsburgh-Wheeling district, for example, have such expansion programs under way.

Canada . . .

Toronto, Ont. — Supply situation in the Canadian iron and steel markets is becoming more critical, rather than showing improvement. While indications are there will be betterment in supply of some rolled steel products about the middle of the year when Steel Co. of Canada completes a new unit at its Hamilton works, improvement in this direction may be at the expense of other lines as it is understood the supply of steel will not be sufficient to feed all finishing departments.

Consumers' supply quotas which

were reduced for first quarter are expected to remain unchanged for second quarter, while on some lines further cuts may be anticipated. The government's import control program on steel, especially structural shapes, which has been postponed until Mar. 1, will make it necessary to spread domestic production over a larger number of users, and contractors and others have been advised to make sure of government permits before proceeding with new construction projects. So far this year, however, supply of structural shapes has not been too tight. Cold-drawn steel bars, in some sizes, as well as alloy bars, however, are about the only items on the list where fairly easy delivery can be obtained.

Allocation of Pig Iron Discussed at Meeting

(*Continued from Page 55*)

nace Co., Pittsburgh; L. T. Johnston, American Rolling Mill Co., Middletown, O.; John T. Whiting, Alan Wood Steel Co., Conshohocken, Pa.; C. H. Longfield, Youngstown Sheet & Tube Co., Youngstown, O.; W. E. Scott, Pittsburgh Coke & Chemical Co., Pittsburgh; Charles S. Northern Jr., Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.; B. S. Stevenson, Tonawanda Iron Co., Tonawanda, N. Y.

Donald Arthur, Koppers Co., Granite City, Ill.; E. A. Jones, Globe Iron Co., Jackson, O.; Ward Coburn, E. & G. Brooke Iron Co., Birdsboro, Pa.; J. B. DeWolf, Woodward Iron Co., Birmingham, Ala.; R. I. Tibolt, Mystic Iron Works, Boston; Harry O. Bercher, Wisconsin Steel Co., Chicago; F. J. Woodburn, American Steel & Wire Co., Cleveland; E. B. Germany, Lone Star Steel Co., Dallas, Tex.; John Neudorfer, Wheeling Steel Corp., Wheeling, W. Va.

A. R. Maxwell, Pittsburgh Steel Co., Pittsburgh; A. T. Galbraith, Crucible Steel Co. of America, New York; A. J. Hazlett, Jones & Laughlin Steel Corp., Pittsburgh; G. F. Griffith, Sharon Steel Corp., Sharon, Pa.; E. A. Schwartz, Portsmouth Steel Corp., Portsmouth, O.; Henry J. Kaiser, Kaiser Co., Fontana, Calif.; Leigh Willard, Interlake Iron Corp., Cleveland.

A week ago the Office of Industry Co-Operation announced appointment of 20 representatives of the farm machinery and equipment manufacturing industry as an advisory committee to consider participation by the industry in the voluntary allocation agreement program. The committee consists of representatives of large, medium and small farm machinery and equipment manufacturers, consideration also being given to geographical location as well as types of equipment produced.

This committee will be asked to consider the feasibility of entering into voluntary agreements regarding the operations of the farm machinery and equipment manufacturing industry with the idea of increasing production of items most urgently needed to meet food requirements. Consultations with representatives of labor will also be arranged, and other committees will be formed later to deal with questions of distribution and consumption.

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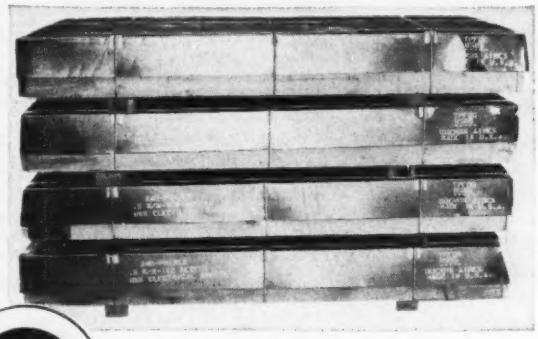

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George A. Kelly, G. A. Kelly Plow Co., Longview, Tex.; W. K. Hyslop, Massey-Harris Co., Racine, Wis.; Henry Synck, New Idea Farm Equipment Co., Coldwater, O.; Alva W. Phelps, Oliver Corp., Chicago; Harry Cobey, Perfection Steel Body Co., Galion, O.; B. B. Bell, Starline Inc., Harvard, Ill.; F. J. Daugherty, Valley Mfg. Co., Valley, Nebr.; R. M. Wade, R. M. Wade & Co., Portland, Oreg.

Electric Motor Output Cut by Jack & Heintz

Reflecting exercise of caution until the ratio of supply and demand in the fractional horsepower electric motor field is stabilized, Jack & Heintz Precision Industries Inc., Cleveland, reduced operations in its Motor Division last week to one turn a day. However, the other four divisions of the company continue unaffected.

The cutback in the Motor Division, where production is down 33 per cent under the monthly peak of 1947, laid off 200 employees. That division, along with the other divisions, had cut back at the end of December for retooling. Between 700 and 800 persons remain employed in the Motor Division.

With the national situation in fractional horsepower motors confused and demand not definitely established for several months to come, the company decided to cut production until the situation is clarified, a company spokesman said.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

520 tons, alterations, Dudley street station, Metropolitan Transit Authority, Boston, to A. O. Wilson Structural Co., Cambridge, Mass.; direct letting.

400 tons, new plant, I. S. Berlin Printing & Lithographing Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; A. Epstein & Sons Inc., Chicago, engineer.

305 tons, building, International Harvester Co., Des Moines, Iowa, to Pittsburgh Des Moines Steel Co., Pittsburgh.

225 tons, state bridges, Gloucester, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; G. Rotondi & Sons, general contractors.

165 tons, Brantly steam station, Virginia, to Phoenix Bridge Corp., Phoenixville, Pa.

150 tons, building, Power Service Corp., Minneapolis, to Bethlehem Steel Co., Bethlehem, Pa.

130 tons, addition, Providence Body Co., Providence, R. I., to Phoenix Bridge Corp., Phoenixville, Pa.

100 tons, addition, New England Casket Co., Cambridge, Mass., to Phoenix Bridge Corp., Phoenixville, Pa.

STRUCTURAL STEEL PENDING

37,000 tons, superstructure, Mystic River bridge, Boston; bids postponed to Feb. 26.

6,350 tons, Hungry Horse dam, Montana, including tubing and miscellaneous metal items; bids to Denver about Feb. 23.

1500 tons, power house, Public Service Co. of Colorado.

1260 tons, bridge, No. 2938, Montezuma, Ind., for State Highway Department; bids Feb. 17.

900 tons, office and warehouse, American Stores, Philadelphia; bids in.

775 tons, overpass and underpass, route 26 extension, section 1-A, Trenton, N. J.; bids Feb. 26, state highway commission, Trenton.

500 tons, hydroelectric power plant, Sault Ste. Marie, Mich; bids Mar. 31, U. S. Engineer, Detroit; work also includes 190 tons hydraulic gates.

353 tons, bridge, Sec. 18-F, Louisville, Clay county, Ill., for State Highways Division; Midland Structural Steel Co., Cicero, Ill., low; bids Feb. 10.

300 tons, warehouse, Gulf Oil Co., Philadelphia.

280 tons, service bridge, Hulah, Okla., for U. S. Engineer; Mittry Bros. Construction Co., Los Angeles, low on general contract; bids Jan. 17.

262 tons, bridge, Sec. FX-F, Greenup, Cumberland county, Ill., for State Highways Division; American Bridge Co., Pittsburgh, low; bids Feb. 6.

220 tons, bridge, No. 2943, Madison county, Ind., for State Highway Commission; bids Feb. 17.

185 tons, transfer table, Reading Seashore Line, Camden, N. J.; American Bridge Co., Pittsburgh, low.

110 tons, bridge No. 2929, Richmond, Ind., for State Highway Commission; bids Feb. 17.

100 tons, bridge, Johnson county, Ill., for State Highway Commission; R. W. Ford, Marion, Ill., low on general contract; bids Feb. 6.

100 tons, warehouse, Detroit Steel Products Co., Fernwood, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

560 tons, veterans hospital, Ft. Wayne, Ind., for U. S. Veterans Administration, to Joseph T. Ryerson & Son Inc., Chicago; Gust K. Newberg Construction Co., Chicago, contractor.

350 tons, power plant, West Springfield, Mass., to Truscon Steel Co., Boston; Stone & Webster Engineering Corp., Boston, contractor-engineer.

300 tons, buildings, University of Connecticut, Storrs, Conn., to Truscon Steel Co., Boston.

200 tons, two piers, Mystic River bridge, Boston, to Bethlehem Steel Co., Bethlehem, Pa.; V. Barletta Co., Boston, general contractor.

140 tons, state bridges, Gloucester, Mass., to Truscon Steel Co., Boston; G. Rotondi & Sons, general contractors.

125 tons, state bridge and culvert, Snohomish county, Washington, to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

7,150 tons, Hungry Horse dam, Montana; bids to Denver about Feb. 23.

2,000 tons, siphons for three Columbia Basin canals.

1335 tons, Central Valley project, California, chief engineer, Bureau of Reclamation, Denver.

1000 tons, hydroelectric power plant, Sault Ste. Marie, Mich.; bids Mar. 31, U. S. Engineer, Detroit.

675 tons, overpass and underpass, route 26

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extension, section 1-A, Trenton, N. J.; bids Feb. 26, state highway commission, Trenton.

190 tons, Gassy Sound bridge substructure, Wildwood, N. J.; bids Feb. 26, state highway commission, Trenton.

PIPE . . .

CAST IRON PIPE PLACED

564 tons, stock for Portland, Oreg., and Tumwater, Wash., system expansion, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

195 tons, stock for Portland, Oreg., to American Cast Iron Pipe Co. and Pacific States Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

230 tons, 8-in., Davis-Montham air field, Tucson, Ariz.; bids in.

Unstated, pipe, joints and fittings for treatment plant, Portland, Oreg., bids to G. W. Yates, city purchasing agent, Feb. 17.

Unstated, 3,200 ft. also accessories, Grand Coulee, Wash.; bids to Margaret E. Lytle, city clerk, Feb. 17.

PLATES . . .

PLATES PENDING

2,700 tons, Hungry Horse dam, Montana; bids to Bureau of Reclamation, Denver, about Feb. 23.

Unstated, penstock and discharge pipe, Roza division, Washington state.

Unstated, chute and siphon, Sweetwater canal project, Idaho; bids to Denver, Mar. 2.

Unstated, cement storage plant, Columbia Basin project; Mullin & Sander, Moses Lake, Wash., low $22,941.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian Pacific, 44 diesel-electric locomotives, with 20 1000-hp switch engines placed with Montreal Locomotive Works, Montreal, Que.; and 14 1000-hp switch engines, 5 passenger and 5 freight locomotives with the Canadian Locomotive Co.

Erie, 17 diesel-electric locomotives, comprising 13 switch engines, with 4 to be built by Baldwin Locomotive Works, Eddystone, Pa., 4 by American Locomotive Co., New York, and 5 by Electro-Motive Division of General Motors Corp., La Grange, Ill.; and four 6000 hp freight locomotives, with 2 to be built by American Locomotive Co. and 2 by Electro-Motive Division, General Motors Corp.

LOCOMOTIVES PENDING

St. Louis-San Francisco, four 4500-hp diesel-electric freight locomotives, purchase authorized.

RAILROAD CARS PLACED

Canadian Pacific, 2100 freight cars and 115 passenger cars, placed as follows: 1000 fifty-ton box, 200 ballast and 100 seventy-ton covered hopper cars, to National Steel Car Corp., Hamilton, Ont.; 350 seventy-ton gondolas and 350 seventy-ton triple hopper cars to Eastern Car Co. Ltd., Montreal, Que.; and 100 forty-ton steel caboose cars, to company's own shops at Angus.

Clinchfield Railroad: 1000 fifty-ton hoppers, to American Car & Foundry Co., New York.

Illinois Central, 1000 all-steel 50-ton hopper cars, to General American Transportation Corp., Chicago.

New York Central, 5000 freight cars, to its subsidiary, Despatch Shops Inc., East Rochester, N. Y.; list comprises 2000 55-ton box cars, 2000 55-ton self-clearing hopper cars and 1000 70-ton gondolas. Half of each group is for the New York Central and half for the Pittsburgh & Lake Erie, an affiliated line.

RAILROAD CARS PENDING

Panama Railroad, 20 fifty-ton box cars, steel sheathed; bids closed recently by the general purchasing officer of that railroad, Washington 25, D. C.

CONSTRUCTION AND ENTERPRISE

ALABAMA

BESSEMER, ALA.—Southern Bell Telephone & Telegraph Co. plans to inaugurate a construction and improvement program costing $300,000.

ARKANSAS

SPRINGDALE, ARK.—Heekin Can Co., Cincinnati, has awarded a contract to Austin Construction Co., Cleveland, for erection of a $1 million plant on a 16-acre site here. Facility will eventually produce a complete line of metal containers.

FLORIDA

BARTOW, FLA. — International Minerals & Chemical Corp. reports work has been started by Rust Engineering Co., Pittsburgh, on International's $1,300,000 project, involving design and construction of a system to convey, store, dry and ship phosphate rock at a new mine near here.

MIAMI, FLA.—Eastern Air Lines Inc., Eddie Rickenbacker, president, New York, has awarded a contract to Bethlehem Steel Co. for furnishing the structural steel for a 3-story maintenance building to be constructed at the International Airport here. Total cost of project will be approximately $1 million.

STARKE, FLA.—E. I. duPont De Nemours Co., Wilmington, Del., will build a $1 million ilmenite processing plant here.

GEORGIA

ATLANTA—Standard Oil Co., 746 Marietta St. N.W., plans an $800,000 construction project to include a storage plant, shops, etc.

ATLANTA—Southern Railway System, J. D. Akers, chief engineer, McPherson Square, Washington, has awarded a $112,000 contract to Johnson & Johnson, Rome, for construction of diesel locomotive repair facilities.

ILLINOIS

CICERO, ILL.—Certified Core Oil Division, Socony-Vacuum Oil Co. Inc., 3308 S. Cicero Ave., suffered $500,000 damages recently when fire swept through 41 storage tanks containing base and processed oils.

KENTUCKY

PERRY COUNTY, KY.—Louisville & Nashville Railroad, C. H. Blachman, chief engineer, Louisville, plans to construct a branch line here.

MARYLAND

BALTIMORE—American Bituminuls Co., 1955 Chesapeake Ave., has awarded a contract to Consolidated Engineering Co., 20 E. Franklin St., for a 2-story laboratory.

BALTIMORE—Gulf Oil Corp., 1608 O'Sullivan Bldg., has awarded a contract to Petroleum Equipment Service and Maintenance Co., Allentown, Pa., for construction of additional storage tanks here and in the surrounding area.

NEBRASKA

NORTH PLATTE, NEBR.—Union Pacific Railroad will begin construction next month on a $3,500,000 freight classification yard here. Yard, to be five miles long, is scheduled for completion early next summer.

NORTH CAROLINA

DURHAM, N. C.—Durham Telephone Co. has authorized the following construction: Erection of poles and wire at a cost of $112,000; installation of underground and aerial cables at a cost of $278,000; installation of automatic central equipment at a cost of $300,000.

SALISBURY, N. C.—Southern Bell Telephone & Telegraph Co. plans to inaugurate a construction and improvement program costing $200,000.

OHIO

AVON LAKE, O. — B. F. Goodrich Chemical Co. will soon begin construction on a $3 million plant here on Walker Rd. Project will be adjacent to firm's experimental station.

CINCINNATI—Gruen Watch Co. will build two factories and an office building on newly-acquired property here. The $3 million project is designed to triple the firm's manufacturing and office area.

CLEVELAND—Universal Drafting Machine Corp., E. 31st St. and Payne Ave., has been incorporated by Hubbard Little with a capital of $125,000 to manufacture and sell drafting machines and accessories.

CLEVELAND — Akron-Chicago Transportation Co., Summit Fast Freight Inc. and Inter-State Motor Freight System recently suffered damages estimated at from $500,000 to $700,000 from fire at a warehouse the firms occupy at 4618 Hough Ave. Thirteen truck trailers were destroyed and materials handling equipment was damaged.

ELYRIA, O.—Elyria Parts Division of Thew Shovel Co. has an expansion program in progress to increase its capacity. Project includes expansion of bronze bushing production facilities, installation of new foundry equipment and construction of a warehouse.

MT. VERNON, O. — Cooper-Bessemer Corp. has a $600,000 improvement program in progress here and at its plant in Grove City, Pa. Most of the program consists of retooling with production gains expected in diesel and gas engines of 25 to 30 per cent.

ORRVILLE, O.—City is progressing on improvements at its municipal light plant which will cost approximately $400,000. Principal change will be the installation of a new turbine.

OKLAHOMA

MAYSVILLE, OKLA.—Cities Service Oil Co., Carter Oil Co., Sinclair-Prairie Oil Co. and Warren Petroleum Corp. have construction in progress by Dresser Engineering Co., Tulsa, for erection of a natural gasoline plant capable of ultimately processing 85 million cubic feet of gas a day.

PONCA CITY, OKLA.—Continental Oil Co. will spend $1 million enlarging the 100-octane gasoline plant it recently purchased from the government.

TULSA, OKLA.—Stanolind Pipe Line Co., B. C. Clardy, president, will build a $2,500,000 office building at Sixth St. and Cincinnati Ave.

TULSA, OKLA.—Oklahoma Natural Gas Co., Joseph Bowes, president, plans a $7 million construction program. Project includes development of gas reserves and gas production facilities, extending pipelines to new supplies, and building new transmission lines, compression stations and other units for expansion of service.

SOUTH CAROLINA

GREENVILLE, S. C.—Duke Power Co., W. B. Ellis, manager, contemplates a $300,000 improvement and expansion program in the public transportation system of the city. Project will involve purchase of 10 new trackless trolleys at a cost of $175,000 and expenditure of $25,000 for substation expansion.

TEXAS

AUSTIN, TEX.—Walter E. Seaholm, director of utilities, has announced plans for construction of a new electrical plant to cost $2,500,000. Plans also provide for substations and power lines to be built at an additional cost of $600,000.

HOUSTON, TEX.—Federal Steel Products Co., 415 N. St. Charles St., has plans under consideration for construction of a $100,000 plant to replace facilities destroyed by fire.